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CALIBRATION OF A PREDICTIVE MODEL FOR INSTANTANEOUSLY DISCHARGED DREDGED MATERIAL

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by

Gary W. Bowers
and
Marin K. Goldenblatt
JBF Scientific Corporation
Wilmington, Massachusetts 01887

R-804994

Project Officer

Lorin R. Davis
Ecosystems Modeling and Analysis Branch
Corvallis Environmental Research Laboratory
Corvallis, Oregon 97330

CORVALLIS ENVIRONMENTAL RESEARCH LABORATORY
OFFICE OF RESEARCH AND DEVELOPMENT
U.S. ENVIRONMENTAL PROTECTION AGENCY
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FOREWORD

Effective regulatory and enforcement actions by the Environmental Protection Agency would be virtually impossible without sound scientific data on pollutants and their impacts on an environmental stability and human health. Responsibility for building this data base has been assigned to the EPA's Office of Research and Development and its 15 major installations, one of which is the Corvallis Environmental Research Laboratory (CERL).

The primary mission of the Corvallis Laboratory is research on the effects of environmental pollutants on terrestrial, fresh water and marine ecosystems; the behavior, effects and control of pollutants in lake systems; and development of predicted models on the movement of pollutant in the biosphere.

This report describes the efforts of JBF Scientific and their EPA Grant R-804994 to modify, simplify and calibrate a model for the prediction of the short-term fate of instantaneously dumped dredged material discharged into estuarine and coastal environment.

PREFACE

For years the oceans have been considered the best depository for men's waste materials. The sheer size of the ocean led to the belief that any harm to the aquatic environment caused by the dumping of waste material was inconsequential. However, as the magnitude of the volume of material discharged has risen, so has concern over the impact the procedure has on the local environment.

The study presented in this report represents the work JBF Scientific performed in improving a model originally developed by R.C.Y. Koh and Y.C. Chang for predicting the fate of dredge material in an aquatic environment. The effort included the use of laboratory and field experience to both improve the model's predictive capabilities and simplify its use. As a result of JBF's efforts the model can now more accurately describe the dynamics of a wider range of dredge materials and because of simplifications in its use be accessable to a wider range of users.

ABSTRACT

This report describes JBF Scientific's modifications to a computer model originally developed by R.C.Y. Koh and Y.C. Chang for predicting the physical fate of dredged material instantaneously released into a water column. Changes to the simulation include the calibration and varification of the program's models based upon experimental laboratory data as well as simplification of the model's use. Inputs to the model include initial material characteristics and dynamics, ambient characteristics and dynamics, and site geometry. Outputs include material concentration and position while in the water column and material mound height and concentration after bottom impact.

Included in this report are a description of the model's structure, the changes made to the program, information on field sampling and laboratory procedures needed to develop input values, and examples of model operation. The model has three versions, exercising various levels of input/output complexity and computer storage requirements. A complete listing of the input variables necessary to exercise each version is presented as well as the outputs to be expected when the program is run with a representative data set.

This report was submitted in fulfillment of grant R-804994 by JBF Scientific under sponsorship of the U.S. Environmental Protection Agency. This report covers a period from August 1976 to December 1977 and was complete as of August 1978.

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SECTION 1

INTRODUCTION

The subject of dredged material dispersion has received considerable attention in recent years as concern has grown for the environmental impact of disposal of dredge materials. While extensive efforts have been directed toward developing mathematical and physical models, these studies have historically been handicapped by lack of sufficient experimental data with which to adequately calibrate and verify results. As a result the models developed have not been universal, but rather have been limited in application for disposal situations similar to that used for the model's development.

Accordingly, the U.S. Environmental Protection Agency, Corvallis Environmental Research Laboratory, sponsored the project reported herein, an effort by JBF Scientific Corporation to improve the predictive capability and to simplify the use of the Koh - Chang mathematical model. Previous work by JBF and by the U.S. Army Corps of Engineers had ascertained that this was the most applicable model available for predicting the physical fate of dredged material dumped in open water. The original model by Koh and Chang (1) was modified under the Corps' Dredged Material Research Program by Tetra Tech Inc. This modified model (2) was taken as the starting point for this project.

Two overall tasks were included in this program. One task was to improve the model's dynamic phase predictive capability through a program of calibration and model testing. That task is the subject of this report.

The second task was to prepare the user's manual portion of ref. 3 which gives details on the application and operation of the computer code along with a complete matrix of sample runs. These runs can be used to approximate dredged material dumping by persons looking for a quick answer and those without access to the computer code.

The program of calibration and model testing was based on a set of data previously developed by tank tests at JBF, relating the behavior of dumped dredged material to the material's physical properties. These tests were performed at depths up to 9 feet. The data yielded correlations which were incorporated into the model, improving the model's representation of the behavior of a cloud of dredged material dumped in water.

In conjunction with improving the model's capabilities through calibration the model was modified in a manner that simplified its use. Unnecessary inputs and outputs were eliminated so that a user interested not in modifying the model but rather in exercising it solely to obtain data on material dynamics will be able to do so with relative ease.

SECTION 2

BACKGROUND: PREVIOUS OBSERVATIONS OF DREDGED MATERIAL DISPERSION

The computer simulation developed by Koh and Chang (1) in 1973 was an attempt to model the dispersion and settling behavior of barge disposed wastes in an open aquatic environment. The model was based on theoretical and experimental studies and for limited applications satisfactorily predicted material behavior. However, the model did have limitations both in the modeling techniques employed and computer code developed. For example, the program was unable to model estuaries, and on some specific runs did not appear to maintain conservation of mass. The intent of this study was to identify the model's limitations and correct them where possible. Included in these changes were simplification of the computer input/output format. All modeling changes were based upon experimental data with the final model verified through independent laboratory data. Problem areas still remaining with the model were identified and recommendations for future work developed.

Early in this study, the modified Koh-Chang model was published by the Corps of Engineers Waterways Experiment Station (WES). Because this updated model removed several of the deficiencies in the original Koh-Chang model, it was taken as the starting point for this effort. To simplify nomenclature in this report, the following terms will be applied to the various developmental stages of the Koh-Chang model:

Description	Term Used in this Report
Original Koh-Chang model (1)	Koh-Chang model
Updated Koh-Chang model published by Corps of Engineers' Waterways Experiment Station (WES)	WES model

Model resulting from this study for EPA's Corvallis Environmental Research Lab (CERL)	CERL model

The WES model's approach to the simulation of dredged material dispersion is to assume that the material consists of two components: solid and liquid. The solid component describes both the bulk properties of the material and the properties of the discrete material components which are assumed to act independently of each other. For example, each dredged material considered has a set of parameters describing the behavior of the bulk material. Similarly, the individual solid components that make up the bulk material have a set of parameters describing their individual behavior. In this manner the dynamics of the material cloud can be modeled while accounting for the settling of component materials to the bottom.

Dispersion properties of the dredged material are divided into three sequential phases by all of the models under consideration. The first phase (convective descent) models the dynamics of the dredged material that are dominated by the initial material momentum and buoyancy. The second phase (dynamic collapse) models cloud behavior resulting from bottom impact or from reaching a point of neutral buoyancy. Momentum changes from vertical descent to horizontal spreading in this phase. The third phase (long term diffusion) models the period where cloud behavior is essentially controlled by ambient dynamics.

JBF's early use of the Koh-Change model, and their comparisons of its prediction to field data and tank tests, revealed several conceptual inaccuracies in the model.

The cohesive properties of fine sediments were not adequately represented in the Koh-Change model. It has been demonstrated through tank testing and through field observations that fine sediments can behave as a cohesive mass rather than as individual particles, profoundly influencing the behavior of all phases descent, collapse, mounding, flow, and long-term dispersion.

Entrainment coefficients are another complex area in which the Koh-Change and WES models appeared oversimplified. (We wish to emphasize the difference between simplicity of some of the model structure, which is noted here as a liability, and simplicity of use, which of course is an asset). In the earlier models the entrainment coefficient, α, is constant. However, dumping experiments in tanks at JBF (4) indicated that α is a function of percent moisture and cohesion for each material dumped. At low moisture content, cohesive materials (silts and clays) fell to the bottom of the tank with no entrainment, as would a "solid" mass. The greater percent moisture (PCM), in turn, allowed a higher entrainment coefficient and thus a faster entrainment and dilution of the cloud. As a result of these observations, it was believed that an accurate description of entrainment must explicitly include functional dependence on percent moisture and liquid limit of the dredged material. An error in specifying the entrainment coefficient results in significant computational errors in cloud radius, descent velocity, impact velocity, and other important aspects of material fate.

Similarly, JBF's use of the model revealed mathematical and programming problems with the computer simulation. Some of these problems were programming errors and fairly simple to rectify; others related to the basic modeling approach. The first area to be discussed is the original form of output for the long-term dispersion phase. The complex diffusion equations for this phase were solved by the Aris method of moments (1). This method yielded only moments of the concentration distribution as a function of time - not the distribution itself. Therefore, it was impossible to determine material concentrations at points in the water column or amount of material deposited at points on the ocean floor without assuming a distribution. It should be noted that the first two model phases (convective descent and dynamic collapse) do not use the method of moments and, therefore, give actual concentrations in the water column during those two model stages.

A second important problem was the programming of the ambient velocity profile and its effect on calculated entrainment during the collapse phase. The Koh-Chang model was found incapable of accommodating a horizontal velocity of any realistic magnitude. During one project in which JBF used the Koh-Chang model, it was found necessary to specify a zero ambient velocity. When non-zero velocities were input, the cloud very rapidly grew to enormous (and obviously incorrect) dimensions. The model was not designed for dump situations in which the waste cloud becomes flattened on the bottom. The model used the entire cloud surface area for entrainment calculations and an entraining velocity equal to the net velocity vector of the cloud relative to the ambient. In this case, when the cloud has flattened on the bottom, the only significant velocity of the cloud with respect to the ambient was the horizontal velocity. At the same time, the cloud had rapidly flattened to a pancake shape with a large horizontal diameter and little height. Thus the surface area of the cloud becomes very large compared to its volume while the net velocity used in calculating entrainment is largely parallel to the cloud surface. Because the true entrainment velocity would not be perpendicular to this large surface area, the amount of entrainment was considerably overestimated by the program.

Another problem encountered in operating the model with an ambient current was that conservation of momentum did not appear to be satisfied. This was illustrated by running the model with an ambient current in, say, the x-direction and releasing a dump having an initial velocity also in the x-direction and at the same magnitude as the current velocity. Under these conditions the dump should move downstream with the current at constant velocity (the current velocity) while it sinks. In fact, in such a run the dump decelerated and did not keep up with the current. The problem was traced to an inconsistent accounting of the momentum of the cloud and of its added mass.

The final conceptual shortcoming identified was the model's handling of bottom topography. The Koh-Chang model assumed a flat ocean bottom, with an allowance for a roughness coefficient. The literature related to density currents makes the point repeatedly that bottom topography is an important determinant of the path of a density current. In addition, a sensitivity analysis of the Koh-Chang model (4) showed that the model output was insensitive to clearly another area requiring improvement.

The model used as the basis for this project was the latest available version of the WES model. The above problems, as well as some more minor shortcomings, had been substantially solved during development of that version of the model. However, during that refinement of the model, no attempt was made to relate material properties, such as moisture content of the material, to the dynamics of the disposed dredged material.

JBF performed a sensitivity analysis of the original Koh-Chang model (4). This analysis consisted of a parametric variation of inputs, with examination of resultant outputs to identify the input parameter variations to which the model was most sensitive. Only the variations in entrainment coefficient and particle settling velocity were found to affect output results dramatically. The model was found to be moderately sensitive to other input parameters, such as virtual mass and drag coefficient, and quite insensitive to variations in many other input parameters. These results showed that a simplified version of the model which would make the model easier to use and less expensive to run was distinctly possible.

The data used in support of this study were developed by dropping San Francisco Bay and New England harbor dredged materials in tanks with water depths of 18", 2', 4' and 9'. In these studies the method of release, quantity of material released, material type and material characteristics were controlled and data was collected which described their effects on cloud descent, bottom mounding and bottom flow characteristics.

For example, the effect of moisture content upon entrainment coefficient for a silt material is shown in Figure 1. As the material's moisture content increased its entrainment coefficient also increased until the material started to behave as a fluid and the entrainment coefficient approached the entrainment coefficient of a fluid cloud. The effect of moisture content, and consequently, cloud entrainment on

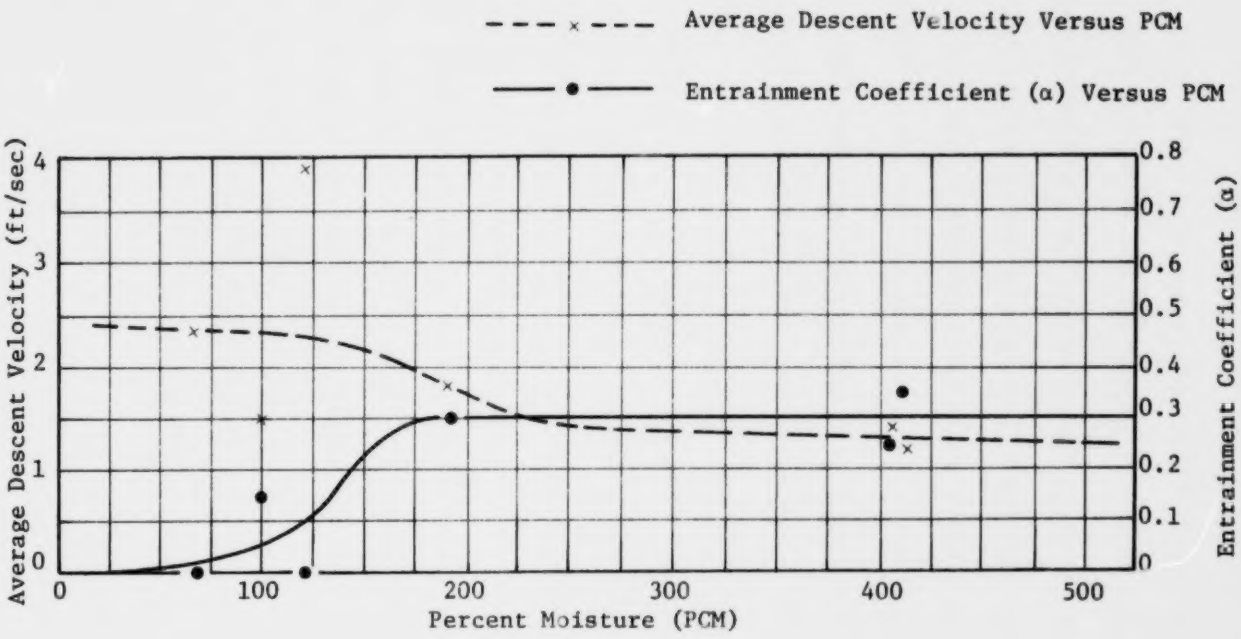

Figure 1. Percent moisture effect during descent phase for silt.

descent velocity can also be seen in Figure 1. As expected, increased cloud entrainment results in a decrease in descent velocity.

The material behavior on the bottom was also found to be strongly dependent on moisture content. Figure 2 illustrates the effect of moisture content on the rate of horizontal flow of material along the bottom after impact, and Figure 3 shows mounding characteristics as a function of moisture content (both for a silt material). It is apparent that for the material shown, between moisture contents of 100 and 200 percent moisture (PCM) there is a transition range from high cohesiveness and little bottom flow to low cohesiveness and rapid bottom flow of materials. Below 100 PCM this material mounds in a clump at the impact point while above 200 PCM most of it spreads in a bottom flow.

On the basis of these and other observations that were made for both clay and silt materials, it was hypothesized that dumping characteristics (for clay and silt) fall into two distinct modes. The "solid" mode is a characteristic of materials with low percent moisture and in this mode the dumped volume falls as a solid block and does not spread much on the bottom. In the "liquid" mode, characteristic of materials with a high moisture content, the dumped material falls as a liquid cloud and spreads like a fluid on the bottom. These modes can be identified by relatively well defined PCM ranges although the cut-off PCM values for each are dependent upon the size and depth of the dump. The "solid" range includes all PCM values below a certain transition point (upper bound of solid range). The "liquid" range includes all PCM values above a somewhat higher transition point (lower bound of liquid range). The PCM range between these two points is a transition range where dumping characteristics vary rapidly with change in PCM and dumps

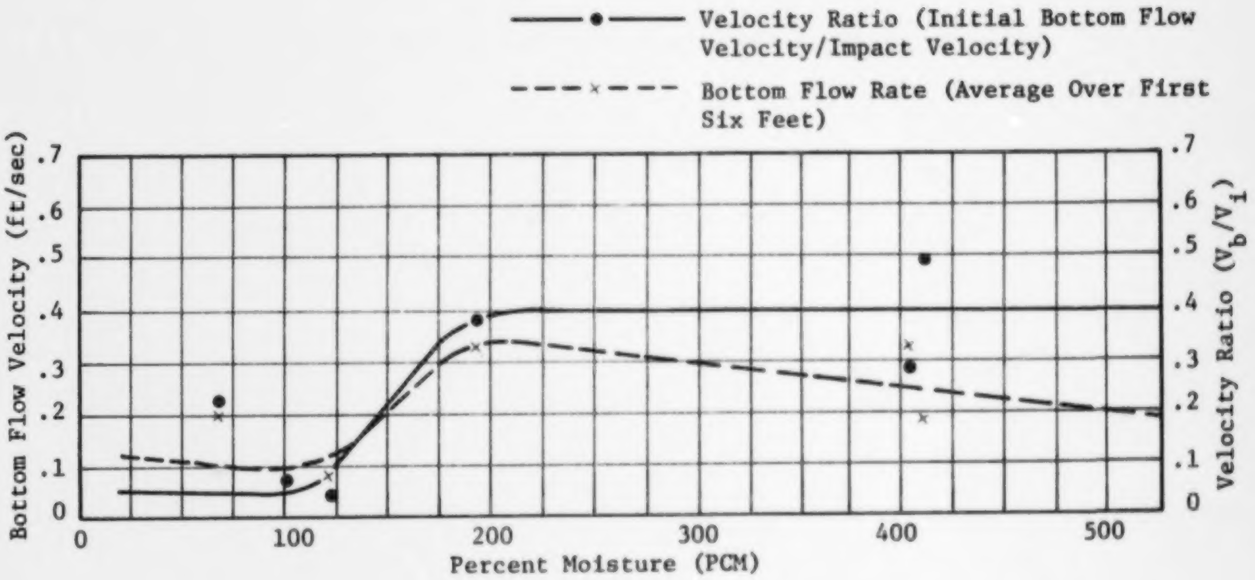

Figure 2. Percent moisture effect on collapse and bottom flow for silt.

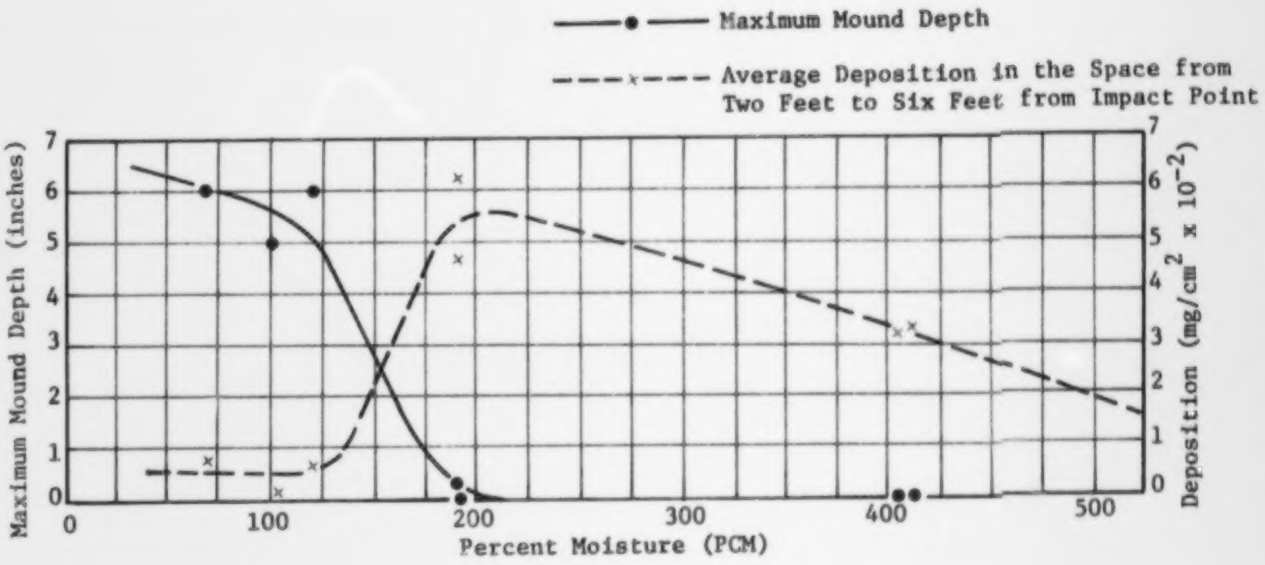

Figure 3. Percent moisture effect on mounding and deposit of silt.

show characteristics of both modes. Although there is some variation in dumping characteristics by PCM within each mode, the differences between modes are much greater and the transition between these modes takes place over a relatively narrow transition range of PCM.

The "solid" dump mode is characterized by a very rapid descent phase, little cloud growth and little spread of the material on the bottom after impact. During descent the material falls like a dense block trailing a turbidity plume behind it. It rapidly reaches its equilibrium velocity and does not decelerate before impact. Entrainment is negligible in the solid mode so that the main cloud has little shape change during descent. Most of the descent energy is absorbed on impact and does not contribute to spreading material along the bottom. Thus, the bottom flow is low in suspended solids and is slow moving. Most of the dump material is deposited in a mound at the impact point.

The "liquid" dump mode is characterized by a slower descent phase with the cloud expanding due to entrainment, and by a rapid flow of material along the bottom after impact. During descent entrainment is significant and the cloud grows rapidly, decelerating while it does so. Impact velocity may not be as high as for equivalent "solid" dumps. Most of the impact energy is redirected to a horizontal momentum that drives the cloud rapidly across the bottom. There is little or no mounding of dumped material at the impact point and most deposited material is carried in a rapidly moving bottom flow.

One very interesting trend to emerge from the mounding data suggests a relationship to a simple property of the soil, the liquid limit, which is the moisture content in percent of dry material as the mixture just begins to flow. Figures 4 and 5 show this trend. Figure 4 shows maximum mound height as a function of percent moisture for a clay and a silt from San Francisco Bay, based on tests in 28-gallon aquaria. This figure indicates differing behavior between the two materials. However, when the liquid limit is divided into PCM, the resultant multiple of liquid limit (MLL) appears to have an important effect, common to the two materials, as shown in Figure 5. This observation indicated one promising area for simplifying dredged material characterization: cohesive behavior as a function of MLL.

It was clear that moisture content and cohesive characteristics are significant variables that have a major influence on the behavior of dumped dredged material - both before and after bottom impact. The Koh-Chang and WES models did not provide any capability for modeling this important effect.

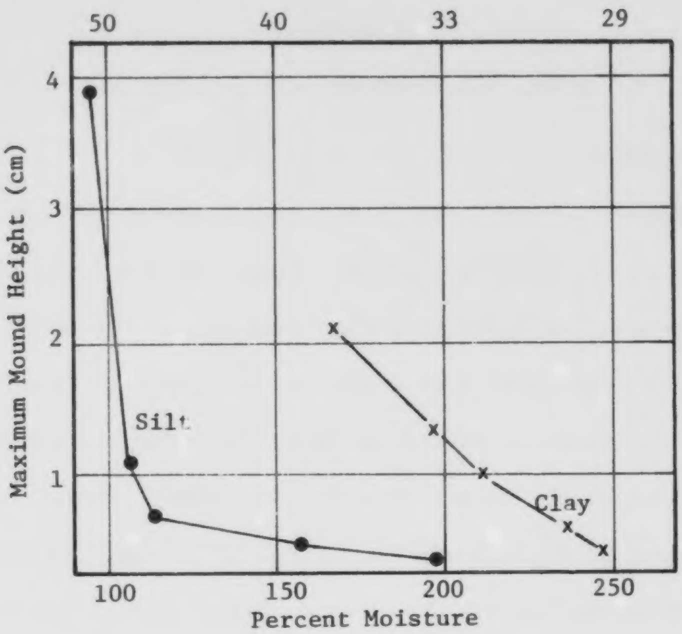

Figure 4. Maximum mound height as affected by percent moisture.

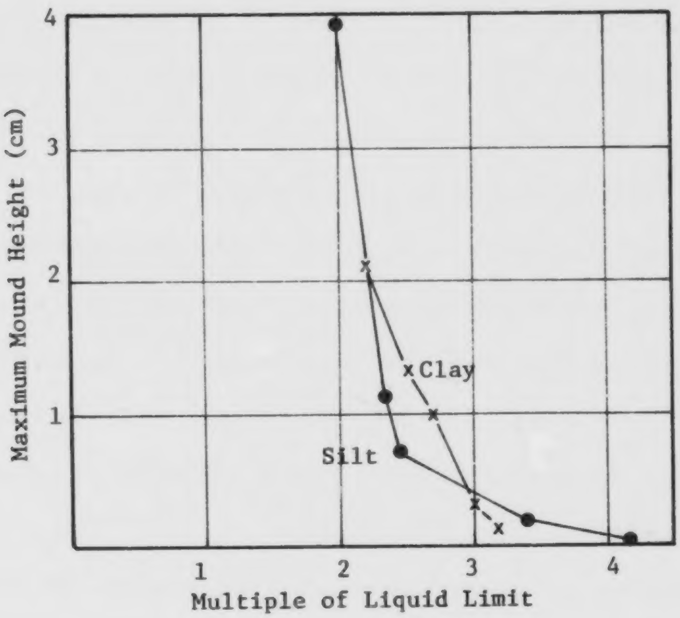

Figure 5. Maximum mound height as affected by multiple of liquid limit.

SECTION 3

MODEL MODIFICATIONS AND CALIBRATION

A. MODEL SELECTED

An extensive literature search was undertaken by JBF to obtain the latest version of the Koh-Chang model. Since the model was being extensively used it was reasonable to expect portions of the model had been modified and improved. The most extensive modification found had been performed for the Corps of Engineers (WES) (2). These changes included a complete revision of the long-term diffusion model. Rather than the method of moments originally modeled by Koh and Chang, the new model uses a convolution method developed by H. Fisher and obtains material concentrations directly.

The long-term diffusion model originally developed by Koh and Chang (1) assumed horizontally uniform, steady currents, and no horizontal boundaries were allowed. The WES model was developed in order to be able to simulate non uniform currents, horizontal boundaries and unsteady flow. As a consequence the method of moments was no longer applicable, resulting in the need to reprogram the long term diffusion stage. The approach selected could handle the above options and was still economical and efficient to run on the computer.

Because the program no longer calculated the moments of the cloud's distribution the original computer output had become obsolete. The original output forms were modified in the WES model to reflect the concentration data.

The resulting model was subsequently modified by the U.S. Army Engineer Waterways Experiment Station (WES) to eliminate some programming errors in the program's long term diffusion computer subroutines. It is this latest version of the model that JBF selected as the baseline model from which to work.

B. MODEL INPUT SIMPLIFICATION

The original input format for the model was extensive and required the user to have a knowledge not only of the process being simulated but also the formulation of the computer simulation itself. For instance, the first three input cards are keys which produce results internal to the program, but which are not related to the physics of the dump. Other quantities, such as a user specified long term time step, or the number of transition levels from short term to long term diffusion, require a knowledge of the program structure to estimate accurately. The initial effort undertaken by JBF was to simplify the input/output formats so that a user could set up his problem in terms of known material and water column characteristics.

As a first step in the format simplification procedure a telephone survey was conducted with marine biologists to determine input parameters that can be easily identified and output parameters of primary importance. As a result of these conversations it was decided to reduce the input data required by eliminating theoretical coefficients and parameters that only control mathematical procedures. Output data was reduced by eliminating output not related to material position, concentration, and deposition on the bottom.

Further, the program requires a description of the solid components that make up the material to be studied. The program can handle up to thirteen solid components. A study was performed to identify the sensitivity of model results to the number of components used to simulate a material. Figure 6 is a grain size distribution curve for a representative

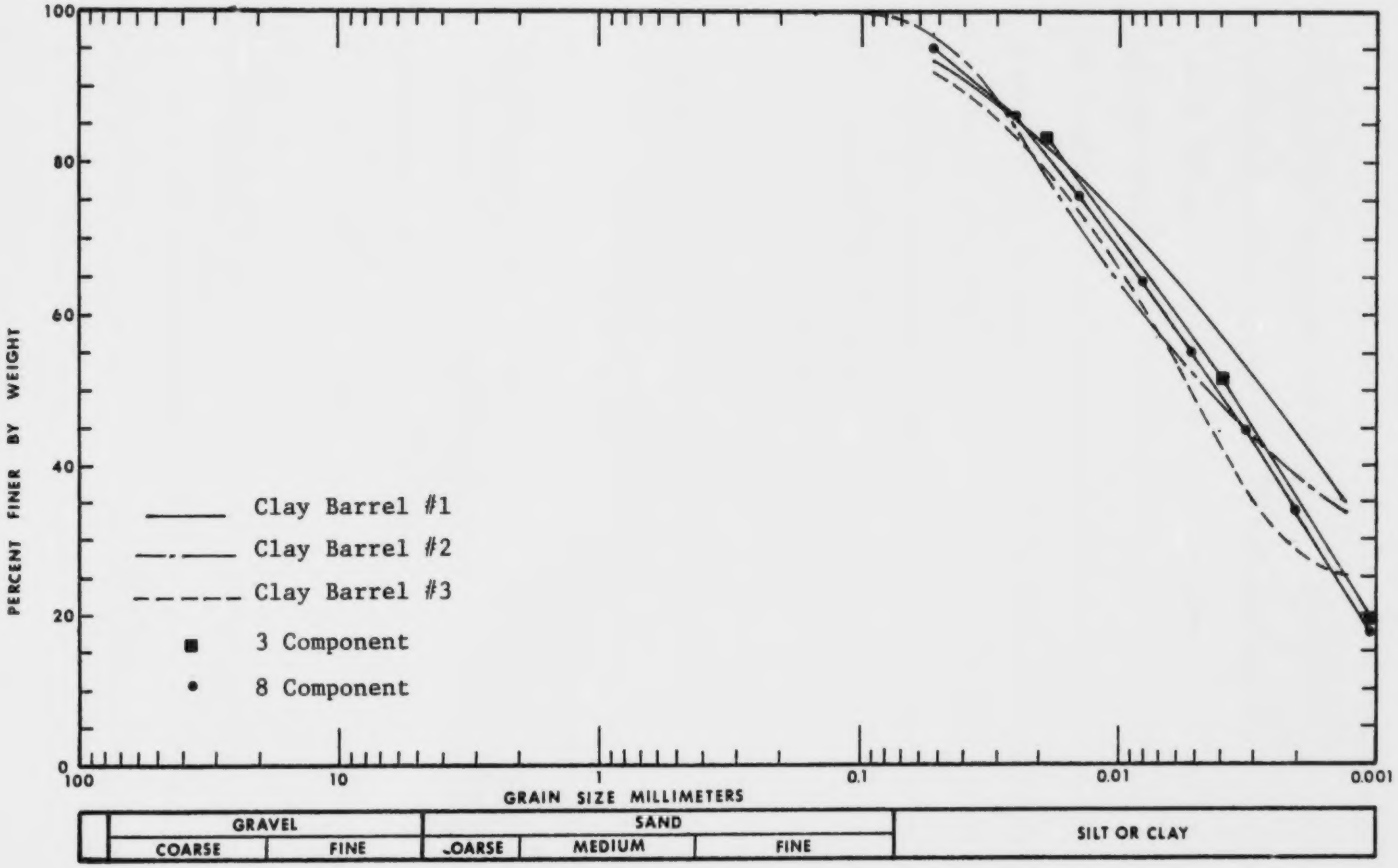

Figure 6. Grain size distribution of representative clay-type materials.

material. The material was described using 3 and 8 solid components. The resulting two input data sets for this model can be seen on Tables 1 and 2. All other parameters remained constant.

Tables 3 and 4 represent the model's output of material position and size for the two runs. As expected the results are identical for the convective descent and collpase phases. Final results from the long term diffusion simulation can be seen in Tables 5 and 6. Comparing the amount of material deposited on the bottom there was more material deposited on the bottom at 1000 seconds for the 8 components case than the three component case. The cause of this effect is that the coarser grain sizes modeled in the eight component case drop to the bottom quickly. Since the three component case had to assume average grain sizes, the amount of material on the bottom for this case will usually be less than a case with higher components. Tables 5 and 6 show that at the 1000 second mark the eight component case had approximately 10% more material on the bottom than the three component case. Since 10% is within experimental and model uncertainty levels, the difference between the two cases can be assumed not important. Hence, only 3 sediment components are required as input if the simplified input format is selected.

A further input reduction explored was the development of a characteristic curve which could be modified to reflect the material being simulated. Figures 7 to 12 are typical gradation curves developed by the Corps of Engineers for various dredged materials. The differences between the curves did not lend themselves to the development of a typical or representative gradation curve. It was concluded that individual gradation curves for each material studied should be developed.

TABLE 1. INPUT DATA SET FOR 8-COMPONENT SIMULATION

```
TWO VELOCITY PROFILES SPECIFIED IN X AND Z DIRECTIONS FOR --QUICK LOOKS--
DEPTH ASSUMED CONSTANT AND VELOCITIES CONSIDERED STEADY IN TIME
VELOCITY PROFILE PARAMETERS FOLLOW...
DU1 =     1.00     DU2 =     2.00     UU1 =    0.      UU2 =    0.
DW1 =     1.00     DW2 =     2.00     WW1 =    0.      WW2 =    0.


TIME PARAMETERS FOLLOW...
TIME OF DUMP =        0.00 SECONDS AFTER START OF TIDAL CYCLE
DURATION OF SIMULATION =    1000.00 SECONDS AFTER DUMP
LONG TERM TIME STEP (DTL) =      50.00 SECONDS


DISCHARGE PARAMETERS...
INITIAL RADIUS OF CLOUD, RB =    .5524630
INITIAL DEPTH OF CLOUD CENTROID, DREL =    .2500
INITIAL CLOUD VELOCITIES...CU(1) =    0.          CV(1) =    0.          CW(1) =    0.

BULK PARAMETERS...
DENSITY, ROC =    1.272200
AGGREGATE VOIDS RATIO, BVOID =    .7800
LIQUID LIMIT =    78.00
AVERAGE SPECIFIC GRAVITY =    2.650


THERE ARE  8 SOLIDS,  PARAMETERS FOLLOW.......

DESCRIPTION  DENSITY(GM/CC)  CONCENTRATION(CUFT/CUFT)  FALL VELOCITY(FT/SEC)   VOIDS RATIO

 100-90          2.650               .1650E-01               .4760E-02           .7800
  90-80          2.650               .1650E-01               .1210E-02           .7800
  80-70          2.650               .1650E-01               .4270E-03           .7800
  70-60          2.650               .1650E-01               .1250E-03           .7800
  60-50          2.650               .1650E-01               .4860E-04           .7800
  50-40          2.650               .1650E-01               .1260E-04           .7800
  40-30          2.650               .1650E-01               .8860E-05           .7800
  .LT. 30        2.650               .4950E-01               .1940E-05           .7800
 FLUID           .9999               .8350                   0.

PERCENT MOISTURE CONTENT =   190.9663,    2.4483    TIMES LIQUID LIMIT
CALCULATED ENTRAINMENT COEFFICIENT =    .274212
```

TABLE 2. INPUT DATA SET FOR 3-COMPONENT SIMULATION

```
TWO VELOCITY PROFILES SPECIFIED IN X AND Z DIRECTIONS FOR --QUICK LOOKS--
DEPTH ASSUMED CONSTANT AND VELOCITIES CONSIDERED STEADY IN TIME
VELOCITY PROFILE PARAMETERS FOLLOW...
DU1 =     1.00      DU2 =     2.00      UU1 =     0.        UU2 =     0.
DW1 =     1.00      DW2 =     2.00      WW1 =     0.        WW2 =     0.


TIME PARAMETERS FOLLOW...
TIME OF DUMP =        0.00 SECONDS AFTER START OF TIDAL CYCLE
DURATION OF SIMULATION =    1000.00 SECONDS AFTER DUMP
LONG TERM TIME STEP (DTL) =       50.00 SECONDS


DISCHARGE PARAMETERS...
INITIAL RADIUS OF CLOUD, R3 =    .5524630
INITIAL DEPTH OF CLOUD CENTROID, DREL =    .2500
INITIAL CLOUD VELOCITIES...CU(1) =    0.          CV(1) =    0.          CW(1) =    0.

BULK PARAMETERS...
DENSITY, ROO =    1.272200
AGGREGATE VOIDS RATIO, BVOID =    .7800
LIQUID LIMIT =    78.00
AVERAGE SPECIFIC GRAVITY =    2.650


THERE ARE  3 SOLIDS,  PARAMETERS FOLLOW.......

DESCRIPTION  DENSITY(GM/CC)  CONCENTRATION(CUFT/CUFT)  FALL VELOCITY(FT/SEC)   VOIDS RATIO

 Q1              2.650               .5500E-01                 .6880E-03        .7800
 Q2              2.650               .5500E-01                 .3060E-04        .7800
 Q3              2.650               .5500E-01                 .4250E-05        .7800
 FLUID           .9999               .8350                     0.

PERCENT MOISTURE CONTENT =   190.5663,    2.4433     TIMES LIQUID LIMIT
CALCULATED ENTRAINMENT COEFFICIENT =    .274212
```

TABLE 3. CLOUD CONFIGURATION DURING CONVECTIVE DESCENT AND COLLAPSE FOR 8-COMPONENT SIMULATION

```
PLOT OF COLLAPSING CLOUD CHARACTERISTICS

INDEPENDENT VARIABLE IS TIME OVER RANGE     0.          9.0232

DEPENDENT VARIABLE, ALL NORMALIZED FOR PLOTTING ON UNIT AXIS

SYMBOL              A                 B            C            Y
MAX PLOTTED      1.4225            6.0117       .03500       3.9306
MIN PLOTTED      0.                0.           0.           0.
REMARKS         VERT SIZE         HOR SIZE    CONCENTRATION  DEPTH


MAX,MIN,INC, OF IND.VAR.
     10.000000          0.                 .20000000

MAX,MIN,INC, OF DEP. VAR.
     1.0000000          0.                 .10000000E-01
```

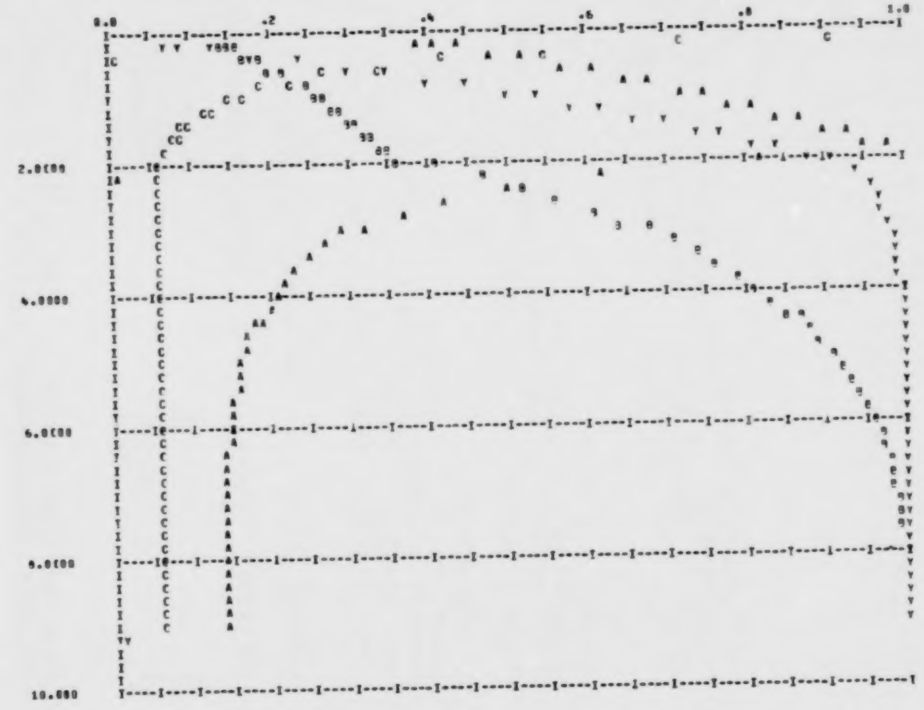

TABLE 4. CLOUD CONFIGURATION DURING CONVECTIVE DESCENT AND COLLAPSE FOR 3-COMPONENT SIMULATION

```
PLOT OF COLLAPSING CLOUD CHARACTERISTICS

INDEPENDENT VARIABLE IS TIME OVER RANGE     0.          9.0232

DEPENDENT VARIABLE, ALL NORMALIZED FOR PLOTTING ON UNIT AXIS

SYMBOL              A               B             C           Y
MAX PLOTTED     1.4225          9.0123        .93504      3.3336
MIN PLOTTED     0.              0.            0.          0.
REMARKS         VERT SIZE       HOR SIZE   CONCENTRATION  DEPTH


MAX,MIN,INC. OF IND.VAR.
      10.000000          0.                .20000000

MAX,MIN,INC. OF DEP. VAR.
      1.0000000          0.                .10000000E-01
```

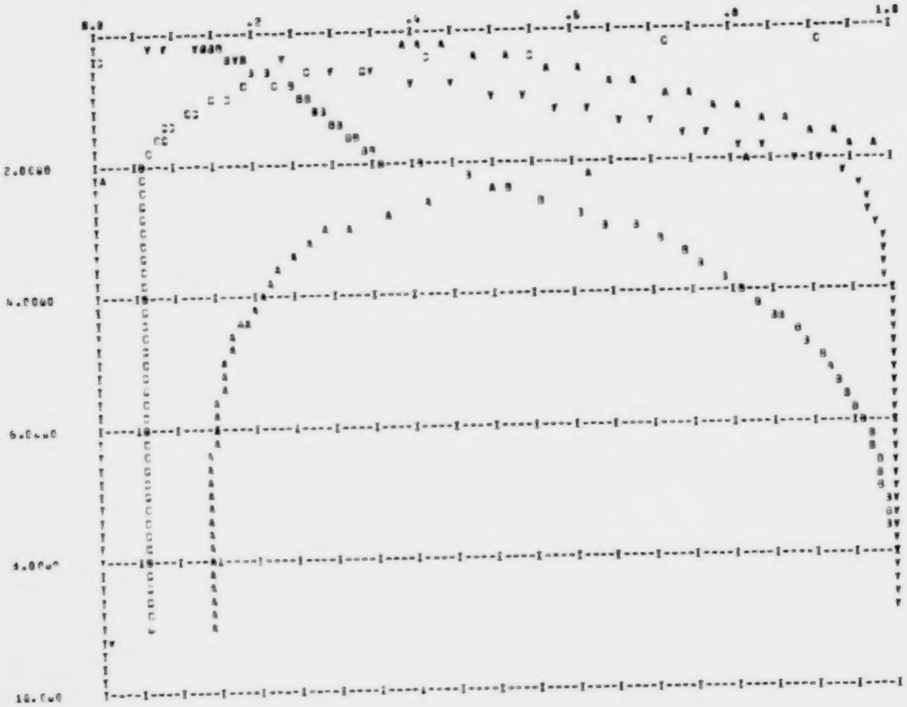

TABLE 5. FINAL MATERIAL ACCUMULATION FOR 8-COMPONENT SIMULATION

```
TOTAL ACCUMULATED SOLID VOLUME ON BOTTOM (CUFT/GRID SQR).    1000.00 SECONDS AFTER DUMP
...MULTIPLY DISPLAYED VALUES BY  .1000E-04     (LEGEND... + = .LT. .01   . = .LT. .0001   0 = .LT. .000001)
M N=  1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16  17  18  19  20  21  22  23  24  25  26  27  28  29  30  31
 1 0000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000
 2 0000   +   +   +   + .01 .01 .02 .02 .03 .03 .03 .03 .03 .03 .03 .03 .03 .03 .03 .02 .02 .01 .01   +   +   +   +   +   .0000
 3 0000   +   + .01 .02 .03 .05 .07 .08 .09 .09 .09 .09 .09 .09 .09 .09 .09 .09 .09 .08 .07 .05 .03 .02 .01   +   +   +   +0000
 4 0000   + .01 .02 .05 .09 .15 .19 .22 .23 .24 .24 .24 .24 .24 .24 .24 .24 .24 .23 .22 .19 .15 .09 .05 .02 .01   +   +   +0000
 5 0000   + .02 .05 .11 .22 .40 .51 .57 .60 .61 .62 .62 .62 .62 .62 .62 .62 .61 .60 .57 .51 .40 .22 .11 .05 .02   +   +   +0000
 6 0000 .01 .03 .09 .22 .53 1.0 1.3 1.4 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.4 1.3 1.0 .53 .22 .09 .03 .01   +   +0000
 7 0000 .01 .05 .15 .40 1.0 4.8 5.4 5.7 5.8 5.8 5.8 5.8 5.8 5.8 5.8 5.8 5.8 5.8 5.8 5.7 5.4 4.8 1.0 .40 .15 .05 .02   +   +0000
 8 0000 .02 .07 .19 .51 1.3 5.4 6.4 6.7 6.8 6.9 6.9 6.9 6.9 6.9 6.9 6.9 6.9 6.8 6.8 6.7 6.4 5.4 1.3 .51 .19 .07 .02   +   +0000
 9 0000 .02 .08 .22 .57 1.4 5.7 6.7 7.1 7.3 7.3 7.3 7.3 7.3 7.3 7.3 7.3 7.3 7.3 7.3 7.1 6.7 5.7 1.4 .57 .22 .08 .03 .01   +0000
10 0000 .03 .09 .23 .60 1.5 5.8 6.8 7.3 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.3 6.8 5.8 1.5 .60 .23 .09 .03 .01   +0000
11 0000 .03 .09 .24 .61 1.5 5.8 6.8 7.3 7.5 7.6 7.6 7.6 7.6 7.6 7.6 7.6 7.6 7.6 7.5 7.3 6.8 5.8 1.5 .61 .24 .09 .03 .01   +0000
12 0000 .03 .09 .24 .62 1.5 5.8 6.9 7.3 7.5 7.6 7.6 7.6 7.6 7.6 7.6 7.6 7.6 7.6 7.5 7.3 6.9 5.8 1.5 .62 .24 .09 .03 .01   +0000
13 0000 .03 .09 .24 .62 1.5 5.8 6.9 7.3 7.5 7.6 7.6 7.6 7.6 7.6 7.6 7.6 7.6 7.6 7.5 7.3 6.9 5.8 1.5 .62 .24 .09 .03 .01   +0000
14 0000 .03 .09 .24 .62 1.5 5.8 6.9 7.3 7.5 7.6 7.6 7.6 7.6 7.6 7.6 7.6 7.6 7.6 7.5 7.3 6.9 5.8 1.5 .62 .24 .09 .03 .01   +0000
15 0000 .03 .09 .24 .62 1.5 5.8 6.9 7.3 7.5 7.6 7.6 7.6 7.6 7.6 7.6 7.6 7.6 7.6 7.5 7.3 6.9 5.8 1.5 .62 .24 .09 .03 .01   +0000
16 0000 .03 .09 .24 .62 1.5 5.8 6.9 7.3 7.5 7.6 7.6 7.6 7.6 7.6 7.6 7.6 7.6 7.6 7.5 7.3 6.9 5.8 1.5 .62 .24 .09 .03 .01   +0000
17 0000 .03 .09 .24 .62 1.5 5.8 6.9 7.3 7.5 7.6 7.6 7.6 7.6 7.6 7.6 7.6 7.6 7.6 7.5 7.3 6.9 5.8 1.5 .62 .24 .09 .03 .01   +0000
18 0000 .03 .09 .24 .62 1.5 5.8 6.9 7.3 7.5 7.6 7.6 7.6 7.6 7.6 7.6 7.6 7.6 7.6 7.5 7.3 6.9 5.8 1.5 .62 .24 .09 .03 .01   +0000
19 0000 .03 .09 .24 .61 1.5 5.8 6.8 7.3 7.5 7.6 7.6 7.6 7.6 7.6 7.6 7.6 7.6 7.6 7.5 7.3 6.8 5.8 1.5 .61 .24 .09 .03 .01   +0000
20 0000 .03 .09 .23 .60 1.5 5.8 6.8 7.3 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.3 6.8 5.8 1.5 .60 .23 .09 .03 .01   +0000
21 0000 .02 .08 .22 .57 1.4 5.7 6.7 7.1 7.3 7.3 7.3 7.3 7.3 7.3 7.3 7.3 7.3 7.3 7.3 7.1 6.7 5.7 1.4 .57 .22 .08 .03 .01   +0000
22 0000 .02 .07 .19 .51 1.3 5.4 6.4 6.7 6.8 6.9 6.9 6.9 6.9 6.9 6.9 6.9 6.9 6.8 6.8 6.7 6.4 5.4 1.3 .51 .19 .07 .02   +   +0000
23 0000 .01 .05 .15 .40 1.0 4.8 5.4 5.7 5.8 5.8 5.8 5.8 5.8 5.8 5.8 5.8 5.8 5.8 5.8 5.7 5.4 4.8 1.0 .40 .15 .05 .02   +   +0000
24 0000 .01 .03 .09 .22 .53 1.0 1.3 1.4 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.4 1.3 1.0 .53 .22 .09 .03 .01   +   +0000
25 0000   + .02 .05 .11 .22 .40 .51 .57 .60 .61 .62 .62 .62 .62 .62 .62 .62 .61 .60 .57 .51 .40 .22 .11 .05 .02   +   +   +0000
26 0000   + .01 .02 .05 .09 .15 .19 .22 .23 .24 .24 .24 .24 .24 .24 .24 .24 .24 .23 .22 .19 .15 .09 .05 .02 .01   +   +   +0000
27 0000   +   + .01 .02 .03 .05 .07 .08 .09 .09 .09 .09 .09 .09 .09 .09 .09 .09 .09 .08 .07 .05 .03 .02 .01   +   +   +   +0000
28 0000   +   +   +   + .01 .02 .02 .03 .03 .03 .03 .03 .03 .03 .03 .03 .03 .03 .03 .03 .02 .02 .01   +   +   +   +   +   .0000
29 0000   +   +   +   +   +   +   + .01 .01 .01 .01 .01 .01 .01 .01 .01 .01 .01 .01 .01   +   +   +   +   +   +   +   +   .0000
30 0000   .   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   .   .   .0000
31 0000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000
```

TABLE 6. FINAL MATERIAL ACCUMULATION FOR 3-COMPONENT SIMULATION

```
TOTAL ACCUMULATED SOLID VOLUME ON BOTTOM (CUFT/GRID SQR),    1000.00 SECONDS AFTER JUMP
...MULTIPLY DISPLAYED VALUES BY   .1000E-04     (LEGEND... + = .LT. .01   . = .LT. .0001   0 = .LT. .000001)
M N=  1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16  17  18  19  20  21  22  23  24  25  26  27  28  29  30 31

 1 000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000

 2 0000   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +  .0000

 3 0000   +   +   +   +   + .01 .01 .02 .02 .02 .02 .02 .02 .02 .02 .02 .02 .02 .02 .02 .01 .01   +   +   +   +   +   +  .0000

 4 0000   +   +   + .01 .03 .06 .08 .09 .09 .09 .09 .09 .09 .09 .09 .09 .09 .09 .09 .09 .08 .06 .03 .01   +   +   +   +  +0000

 5 0000   +   + .01 .04 .14 .34 .44 .47 .48 .48 .48 .48 .48 .48 .48 .48 .48 .48 .48 .47 .44 .34 .14 .04 .01   +   +   +  +0000

 6 0000   +   + .03 .14 .54 1.2 1.6 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.6 1.2 .54 .14 .03   +   +   +  +0000

 7 0000   + .01 .06 .34 1.2 3.8 4.7 5.0 5.1 5.1 5.1 5.1 5.1 5.1 5.1 5.1 5.1 5.1 5.1 5.0 4.7 3.8 1.2 .34 .06 .01   +   +  +0000

 8 0000   + .01 .08 .44 1.6 4.7 6.0 6.3 6.4 6.4 6.4 6.4 6.4 6.4 6.4 6.4 6.4 6.4 6.4 6.3 6.0 4.7 1.6 .44 .08 .01   +   +  +0000

 9 0000   + .02 .09 .47 1.7 5.0 6.3 6.7 6.8 6.8 6.8 6.8 6.8 6.8 6.8 6.8 6.8 6.8 6.8 6.7 6.3 5.0 1.7 .47 .09 .02   +   +  +0000

10 0000   + .02 .09 .48 1.7 5.1 6.4 6.8 6.9 6.9 6.9 6.9 6.9 6.9 6.9 6.9 6.9 6.9 6.9 6.8 6.4 5.1 1.7 .48 .09 .02   +   +  +0000

11 0000   + .02 .09 .48 1.7 5.1 6.4 6.8 6.9 6.9 6.9 6.9 6.9 6.9 6.9 6.9 6.9 6.9 6.9 6.8 6.4 5.1 1.7 .48 .09 .02   +   +  +0000

12 0000   + .02 .09 .48 1.7 5.1 6.4 6.8 6.9 6.9 6.9 6.9 6.9 6.9 6.9 6.9 6.9 6.9 6.9 6.8 6.4 5.1 1.7 .48 .09 .02   +   +  +0000

13 0000   + .02 .09 .48 1.7 5.1 6.4 6.8 6.9 6.9 6.9 6.9 6.9 6.9 6.9 6.9 6.9 6.9 6.9 6.8 6.4 5.1 1.7 .48 .09 .02   +   +  +0000

14 0000   + .02 .09 .48 1.7 5.1 6.4 6.8 6.9 6.9 6.9 6.9 6.9 6.9 6.9 6.9 6.9 6.9 6.9 6.8 6.4 5.1 1.7 .48 .09 .02   +   +  +0000

15 0000   + .02 .09 .48 1.7 5.1 6.4 6.8 6.9 6.9 6.9 6.9 6.9 6.9 6.9 6.9 6.9 6.9 6.9 6.8 6.4 5.1 1.7 .48 .09 .02   +   +  +0000

16 0000   + .02 .09 .48 1.7 5.1 6.4 6.8 6.9 6.9 6.9 6.9 6.9 6.9 6.9 6.9 6.9 6.9 6.9 6.8 6.4 5.1 1.7 .48 .09 .02   +   +  +0000

17 0000   + .02 .09 .48 1.7 5.1 6.4 6.8 6.9 6.9 6.9 6.9 6.9 6.9 6.9 6.9 6.9 6.9 6.9 6.8 6.4 5.1 1.7 .48 .09 .02   +   +  +0000

18 0000   + .02 .09 .48 1.7 5.1 6.4 6.8 6.9 6.9 6.9 6.9 6.9 6.9 6.9 6.9 6.9 6.9 6.9 6.8 6.4 5.1 1.7 .48 .09 .02   +   +  +0000

19 0000   + .02 .09 .48 1.7 5.1 6.4 6.8 6.9 6.9 6.9 6.9 6.9 6.9 6.9 6.9 6.9 6.9 6.9 6.8 6.4 5.1 1.7 .48 .09 .02   +   +  +0000

20 0000   + .02 .09 .48 1.7 5.1 6.4 6.8 6.9 6.9 6.9 6.9 6.9 6.9 6.9 6.9 6.9 6.9 6.9 6.8 6.4 5.1 1.7 .48 .09 .02   +   +  +0000

21 0000   + .02 .09 .47 1.7 5.0 6.3 6.7 6.8 6.8 6.8 6.8 6.8 6.8 6.8 6.8 6.8 6.8 6.8 6.7 6.3 5.0 1.7 .47 .09 .02   +   +  +0000

22 0000   + .01 .08 .44 1.6 4.7 6.0 6.3 6.4 6.4 6.4 6.4 6.4 6.4 6.4 6.4 6.4 6.4 6.4 6.3 6.0 4.7 1.6 .44 .08 .01   +   +  +0000

23 0000   + .01 .06 .34 1.2 3.8 4.7 5.0 5.1 5.1 5.1 5.1 5.1 5.1 5.1 5.1 5.1 5.1 5.1 5.0 4.7 3.8 1.2 .34 .06 .01   +   +  +0000

24 0000   +   + .03 .14 .54 1.2 1.6 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.6 1.2 .54 .14 .03   +   +   +  +0000

25 0000   +   + .01 .04 .14 .34 .44 .47 .48 .48 .48 .48 .48 .48 .48 .48 .48 .48 .48 .47 .44 .34 .14 .04 .01   +   +   +  +0000

26 0000   +   +   + .01 .03 .06 .08 .09 .09 .09 .09 .09 .09 .09 .09 .09 .09 .09 .09 .09 .08 .06 .03 .01   +   +   +   +  +0000

27 0000   +   +   +   +   + .01 .01 .02 .02 .02 .02 .02 .02 .02 .02 .02 .02 .02 .02 .02 .01 .01   +   +   +   +   +   +  .0000

28 0000   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +  .0000

29 0000   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   .  .0000

30 0000   .   .   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   .   .   .  .0000

31 000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000
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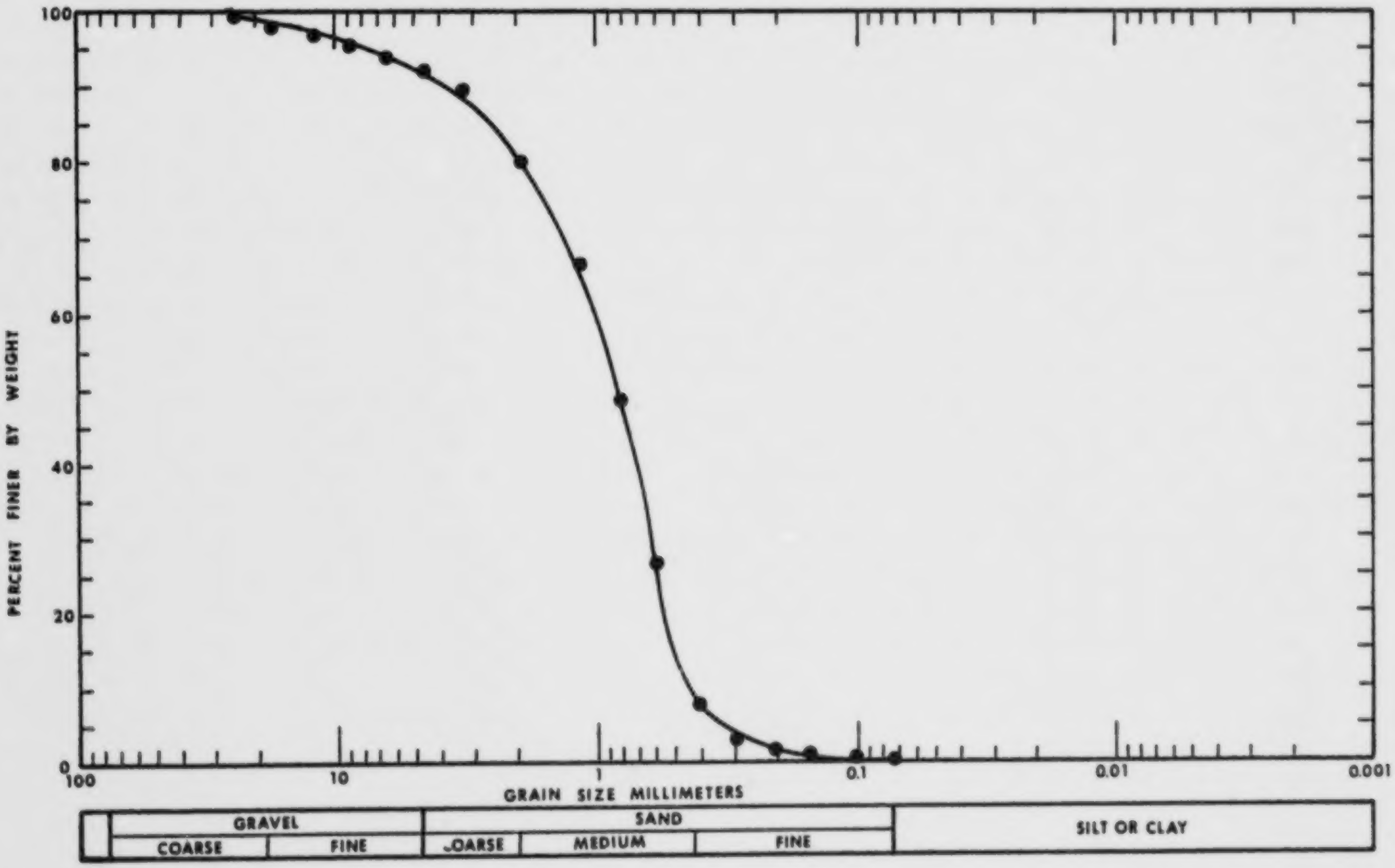


Figure 7. Grain size distribution for Mississippi River sediment.

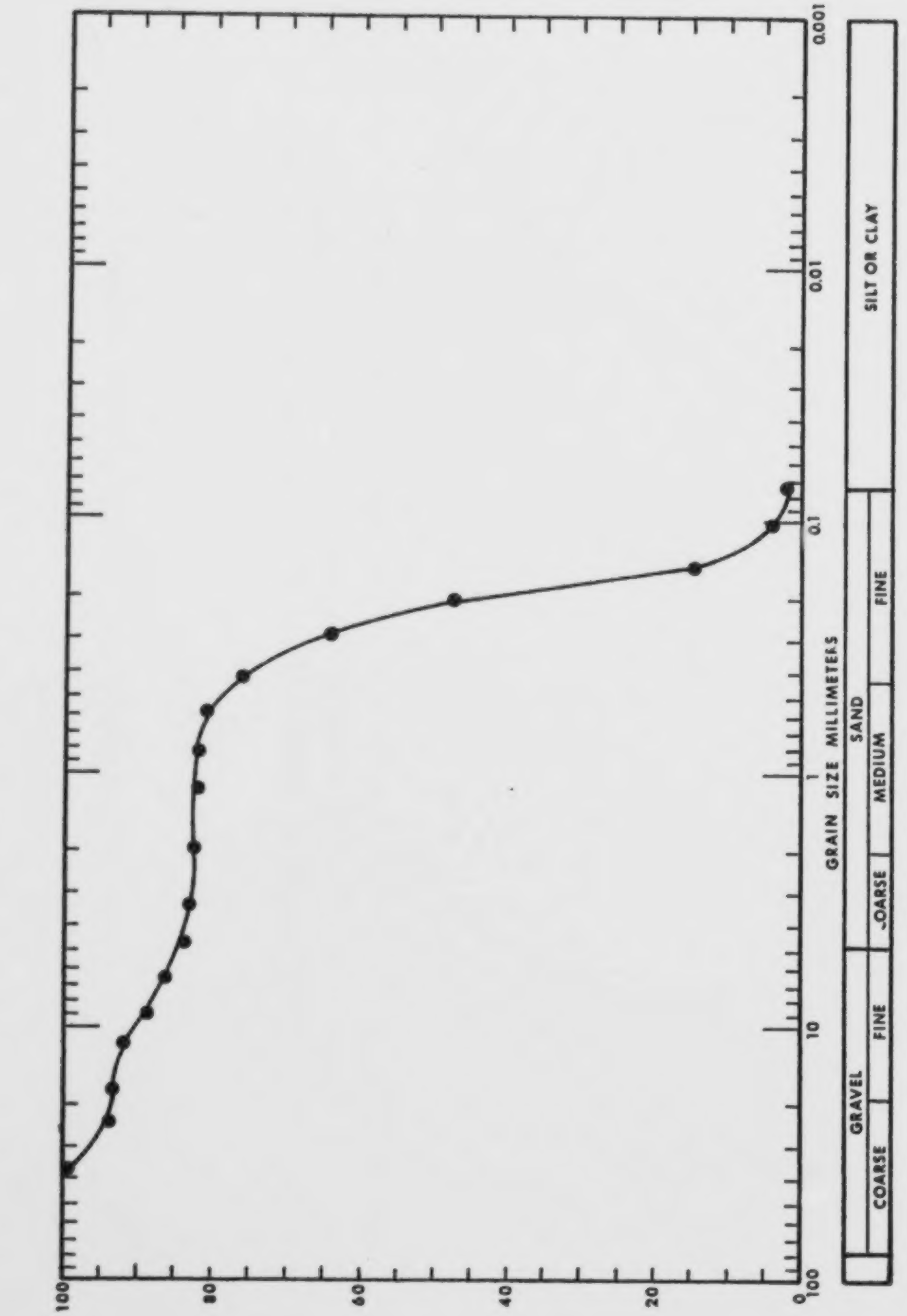


Figure 8. Grain size distribution for Ambrose Channel sediment.

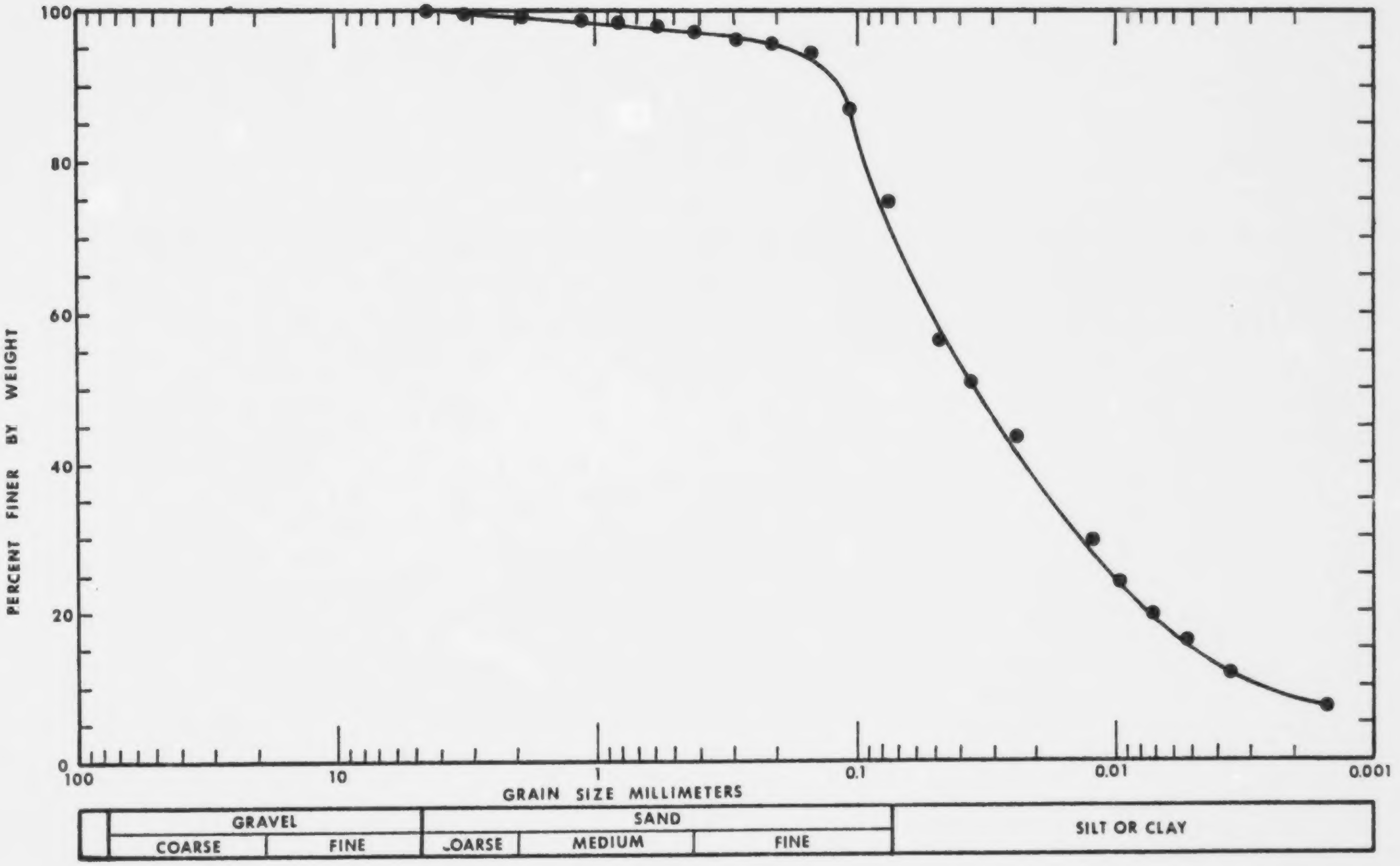


Figure 9. Grain size distribution for Rochester Harbor sediment.

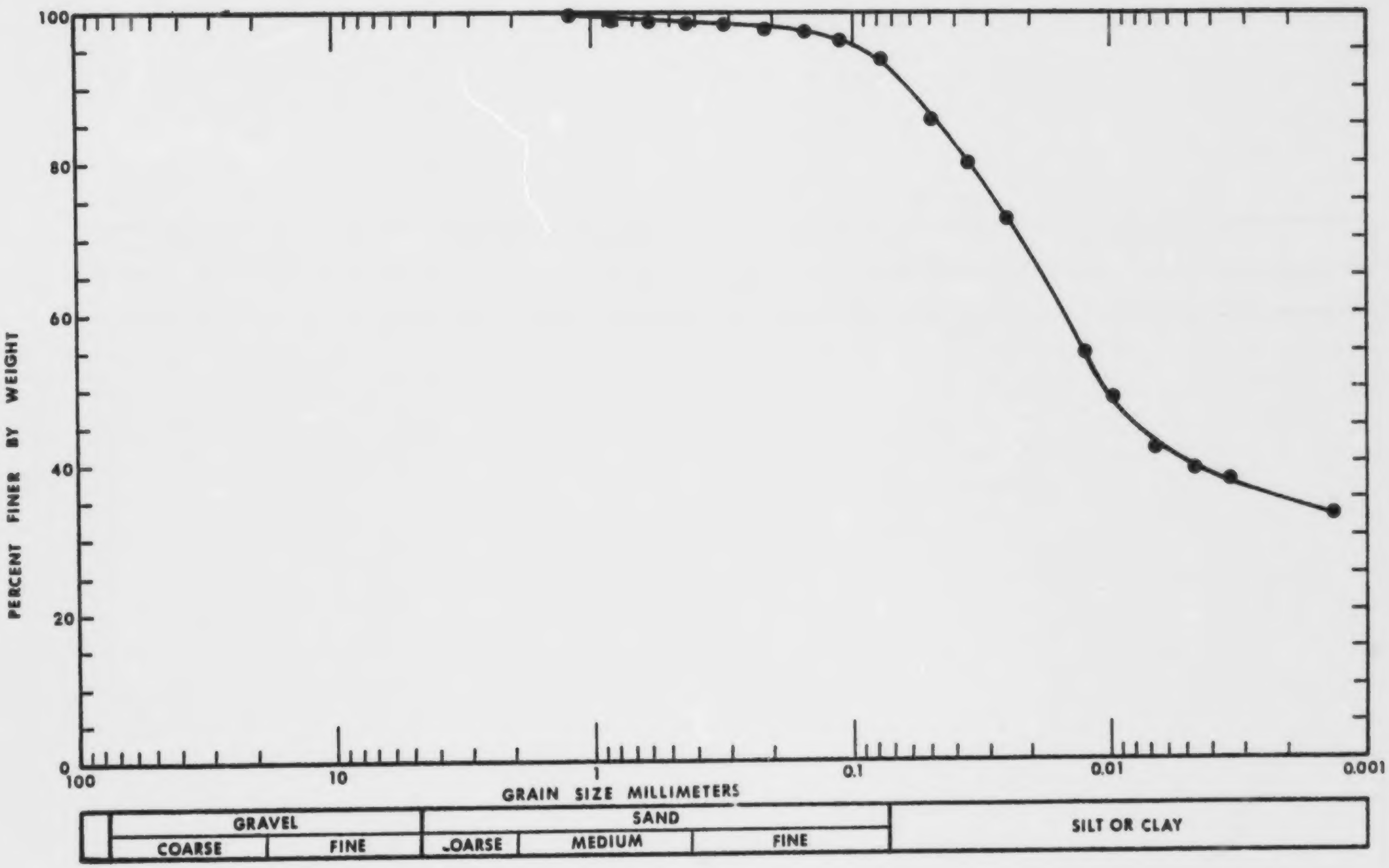


Figure 10. Grain size distribution for Houston Ship Channel sediment.

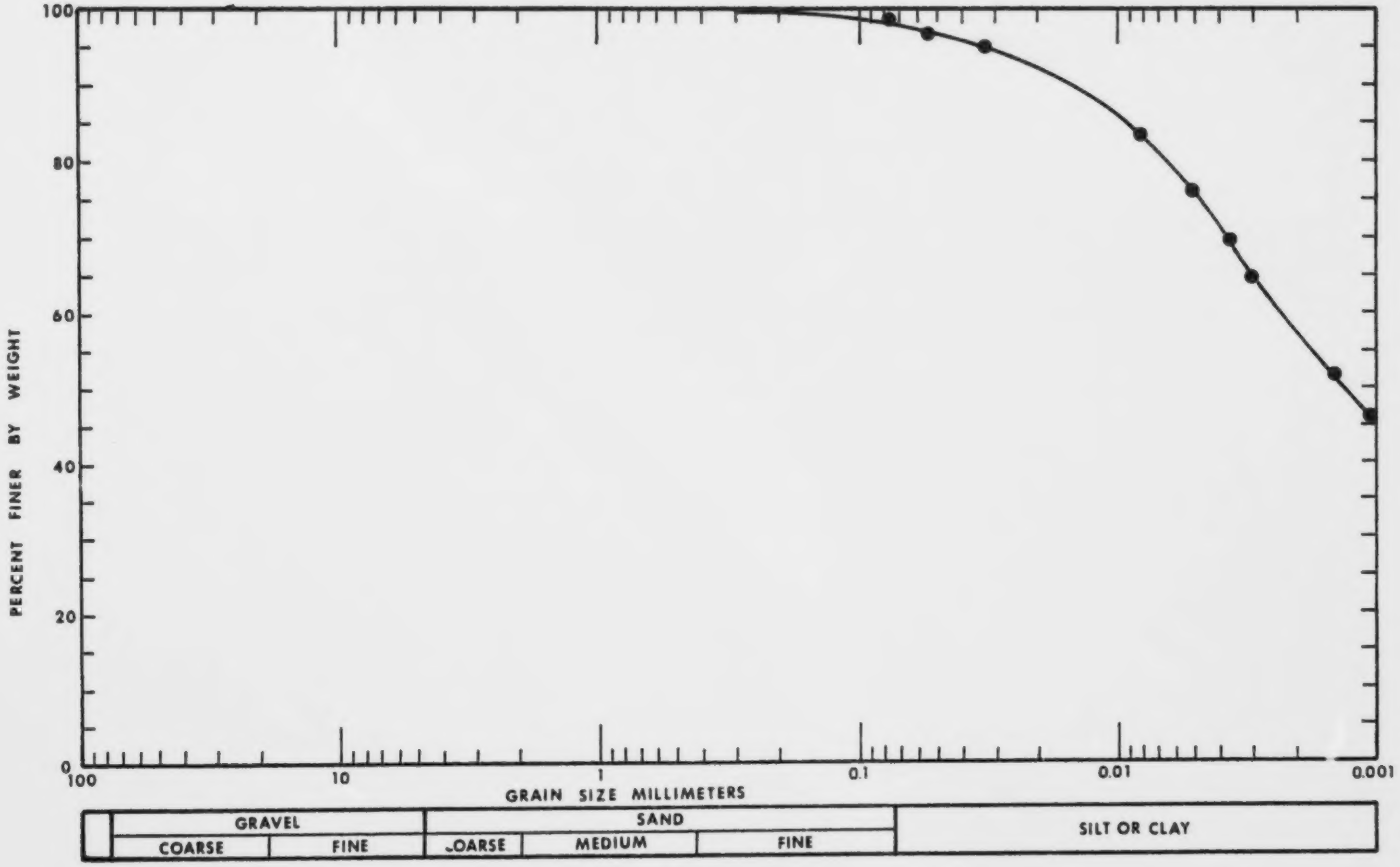


Figure 11. Grain size distribution for Baltimore Harbor sediment.

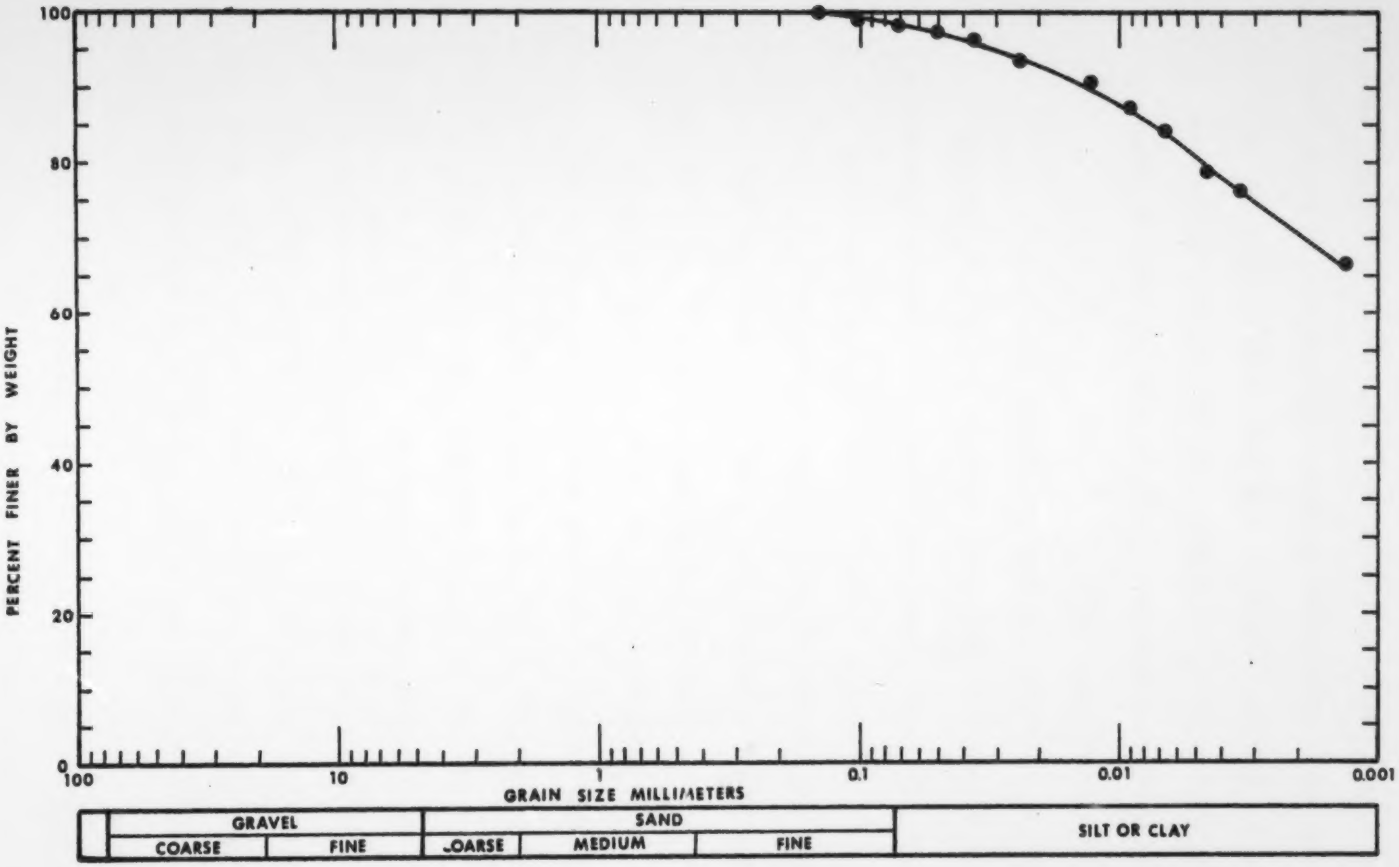


Figure 12. Grain size distribution for Galveston Channel sediment.

Another avenue examined for the simplification of the input format was to attempt to find a relationship between material liquid limit and some easily defined characterization parameter such as median grain size or organic content. Figures 13 and 14 show that while trends can be identified in the effects of median grain size and organic content on liquid limit, data scatter precludes a quantitative correlation which would be useful in the computer model.

C. MODIFICATION OF CONVECTIVE DESCENT EQUATIONS

In the formulation of the Koh-Chang mathematical model, several empirically derived coefficients are used to describe physical phenomena occurring during the convective descent phase. For example, a drag coefficient is used to express the drag forces experienced by a descending cloud of dredged material, as a function of the cloud and the ambient characteristics. Similarly an entrainment coefficient expresses, as a function of cloud dynamics, the rate of entrainment of ambient fluid into a descending cloud of fluid or mud. Entrainment in turn affects the cohesive behavior of the cloud because higher moisture content indicates greater interparticle distance and consequently greater spread of the cloud in the water column.

The procedure adopted for deriving estimates of these coefficients based upon the laboratory tests previously mentioned was first to make photographic records (movies) of the dump tests. The movie data were then used to develop time histories of the dumped cloud size and position during descent.

Next, data representing predictions of time histories of dumped cloud size and position during descent were generated using the WES

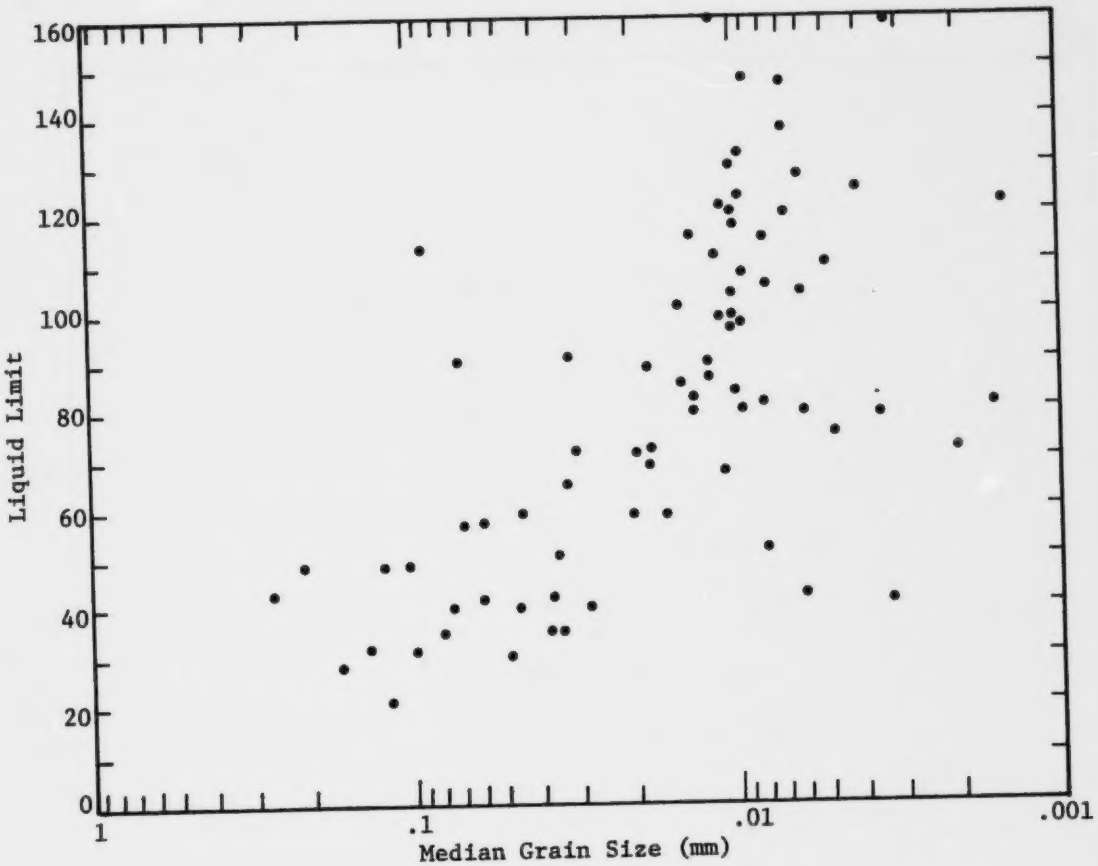


Figure 13. Effect of median grain size on liquid limit (Source: Reference 5)

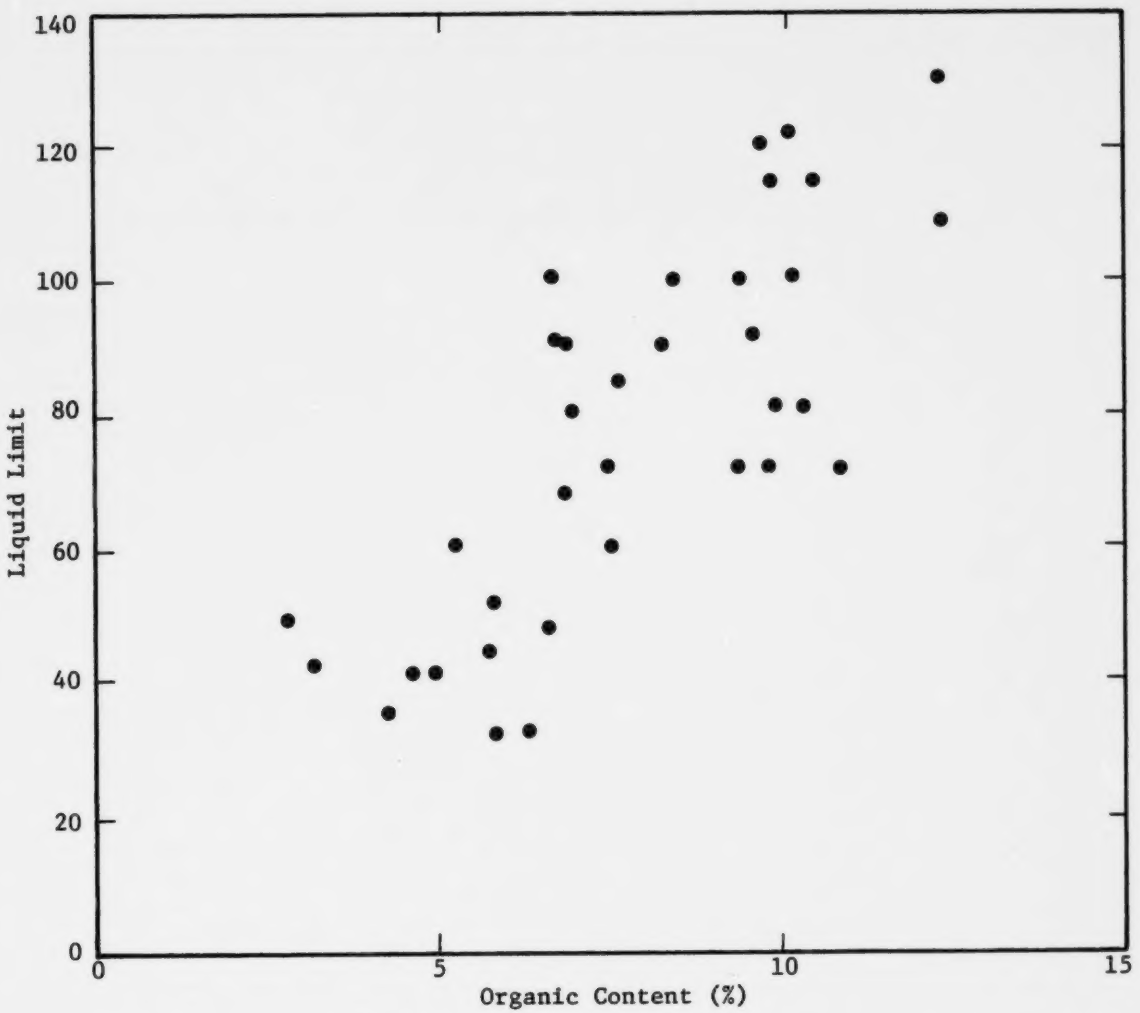


Figure 14. Effect of organic content on liquid limit (Source: Reference 5)

and CERL versions of the computer model. These data were then compared to the laboratory data graphically. In order to calibrate the model properly, the predictions of the model had to be made to correspond as closely as possible to the actual tank test data. This involved determination of the physical properties of the cloud which are most important during the convective phase, and the parameters in the model which affect these properties. Variation of the controlling parameters to produce the best agreement between the model predictions and test tank data consitituted calibration of the model.

The quantities determined to be of import for the convective descent phase were radius of the cloud and velocity on termination of the convective descent phase. The parameters controlling these quantities, to which the model is moderately sensitive, are entrainment coefficient, drag coefficient, and virtual mass coefficient.

In order to determine entrainment coefficient, the radius of the cloud was plotted against depth. The slope of this curve at any time is the entrainment coefficient, and the average slope is the average entrainment coefficient. Hence, the entrainment coefficient was changed in the model until the slope of radius versus depth best matched the tank test data. This procedure was carried out over a variety of moisture contents, in order to produce agreement between model predictions and tank data over the range of conditions encountered during the testing procedure.

When the model predictions of entrainment appeared to match the tank data as closely as possible, attention was turned to velocity, or depth versus time. Data for depth versus time were plotted, and comparisons made between the two model predictions and the tank test data. The drag and virtual mass coefficients were then modified to produce the best agreement between velocity (the slope of the depth versus time curve) of the cloud as observed in the test tank and as predicted by the model. When these slopes were in agreement, the drag and virtual mass coefficients were assumed correct.

The entrainment coefficient (α) is defined by the following relationship:

$$E = 2\Pi b^2 \alpha V \quad (1)$$

where E is entrainment (volume per unit time)

b is cloud radius

V is cloud velocity

Values for α could therefore be estimated from the movie data by the following equation:

$$\alpha = \frac{E}{2\Pi\ b^2 V} \quad (2)$$

where E = change in cloud volume per unit time

$$E = \frac{4}{3}\Pi(b_2{}^2\ r_2 - b_1{}^2\ r_1) \ / \ ({}^t2 - {}^t1) \quad (3)$$

$$V = \text{velocity of cloud} = ({}^d2 - {}^d1) \ / \ ({}^t2 - {}^t1) \quad (4)$$

with b and r the horizontal and vertical cloud radii respectively

d = the cloud depth

t = time since start of the drop

and the subscripts refer to values at the start and end of a small time increment.

By substituting Equations 3 and 4 into Equation 2, and using the average face area of:

$$\text{Average Area} = \frac{\Pi}{2}\left(b_1^{\,2} + b_2^{\,2}\right)$$

the entrainment coefficient can be estimated by:

$$\alpha = \frac{2\left(b_2^{\,2} r_2 - b_1^{\,2} r_1\right)}{3\left(b_1^{\,2} + b_2^{\,2}\right)\left(d_2 - d_1\right)} \qquad (5)$$

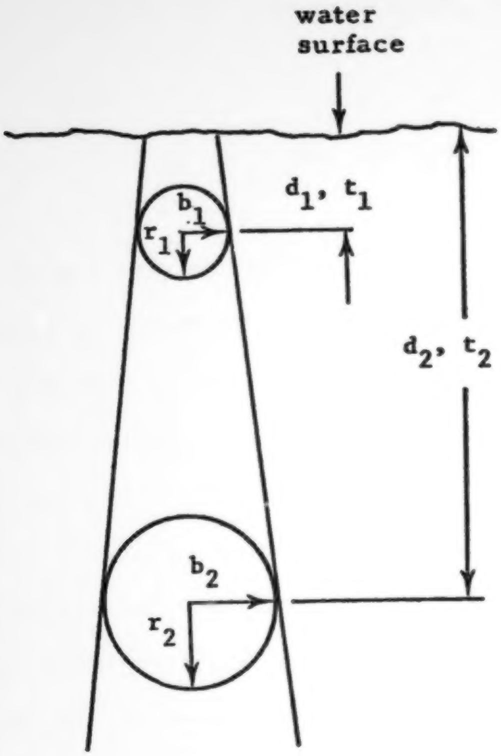
Using the above information, entrainment coefficients were calculated for a series of tank tests of dredged material dispersion. Representative configurations used to calculate entrainment coefficient from movie data are shown in Figure 15. It was found that the MLL has a profound effect on the entrainment coefficient. If a material's MLL was below 1.2, the material behaved as a solid, and did not entrain any fluid. If the PCM was several times the liquid limit, (MLL 3), the material behaved as a liquid cloud and its entrainment was higher than that originally predicted by Koh and Chang. The values found for entrainment coefficient are plotted in Figure 16 as a function of MLL. A polynomial regression was fitted to the data points and the following equations for α as a function of MLL were defined:

$$\alpha = 0 \qquad \text{MLL} < 1.22$$

$$\alpha = .285 + .00493\,(\text{MLL}-2.9) \qquad \text{MLL} < 2.9 \qquad (6)$$

$$\begin{aligned}\alpha = {} & -.002185(\text{MLL})^4 + .0441(\text{MLL})^3 \\ & -.3119(\text{MLL})^2 + .9184(\text{MLL}) - .67273\end{aligned} \qquad 1.22 < \text{MLL} < 2.9$$

The above entrainment-versus-MLL curve was incorporated into the latest version of the computer model, whose output then was compared against several tank tests that were not used in developing Figure 16. Using


water surface
b_1
r_1
d_1, t_1
d_2, t_2
b_2
r_2

b = horizontal cloud radius (ft)
r = vertical cloud radius (ft)
d = depth (ft)
t = time from start of drop (sec)

Figure 15. Schematic of parameters defining cloud properties and behavior.

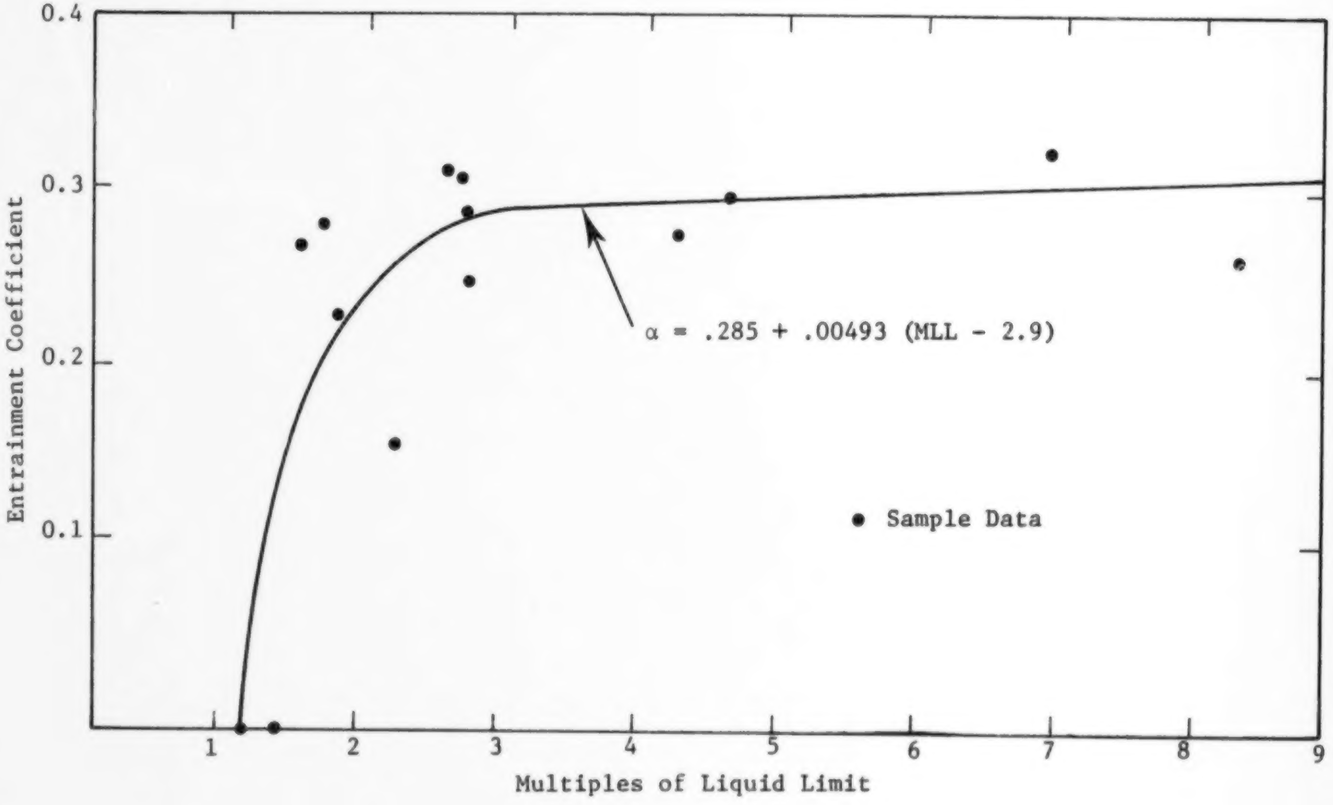


Figure 16. Effect of multiple of liquid limit on entrainment coefficient.

equations (6) to define α resulted in somewhat better comparisons at moderate and high MLL (Figures 17 and 18), and greatly better comparisons at low MLL (Figure 19), between computer predictions for cloud radius at various depths and experimental data.

The computer predictions presented are those from both the unmodified and modified models. The unmodified model is that developed for the Waterways Experiment Station (2) to alleviate some shortcomings in the original Koh-Chang model. The modified model is that developed by calibration using tank test data.

The tank test data plotted are the average of major and minor axes for the cloud, which was generally an ellipsoid. Multiplying values by $\sqrt[3]{2}/2$ will produce the radius of the equivalent hemispherical cloud, the output of the model prediction.

Drag Coefficient

Attention was then turned to the centroid depth versus time. Changes were made in drag coefficient (C_D) in order to produce velocities in the model output comparable to those in the laboratory tests. At low MLL, the material behaved as a solid and it was felt that drag coefficient to be used should be that for a cube or a flat plate. At high MLL, the vorticity present in the cloud tends to reduce drag, so the drag coefficient for a sphere at high Reynolds number was used. In the MLL region in between, a hyperbolic tangent function approximation is used to give a good fit which is asymptotic to the proper limits. The C_D versus MLL curve developed is shown in Figure 20.

Changes in the drag coefficient did not greatly influence the predicted centroid depth versus time (Figure 21). For example, a variation of C_D by 33 1/3% produces a 2.7% variation in time required to

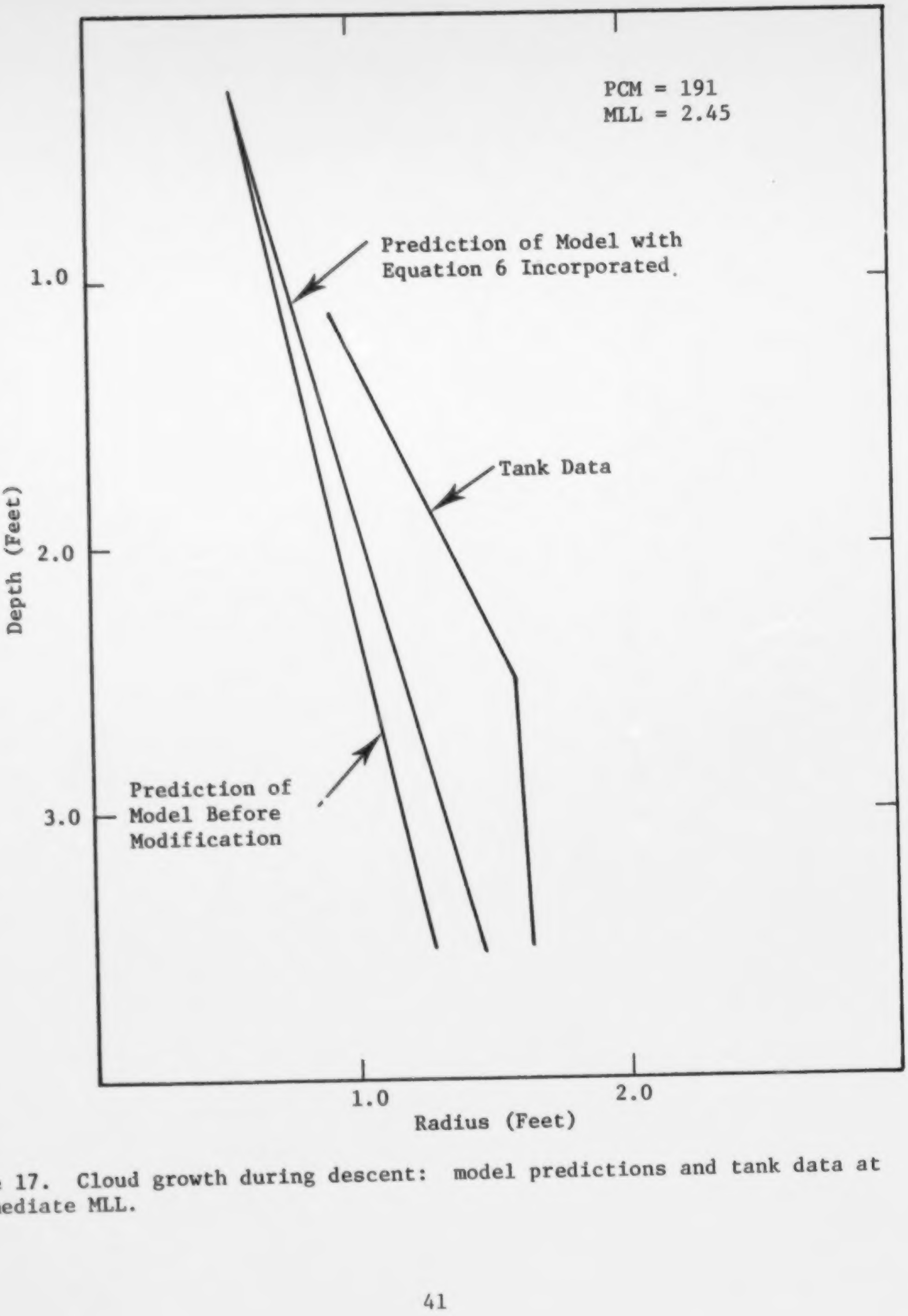


Figure 17. Cloud growth during descent: model predictions and tank data at intermediate MLL.

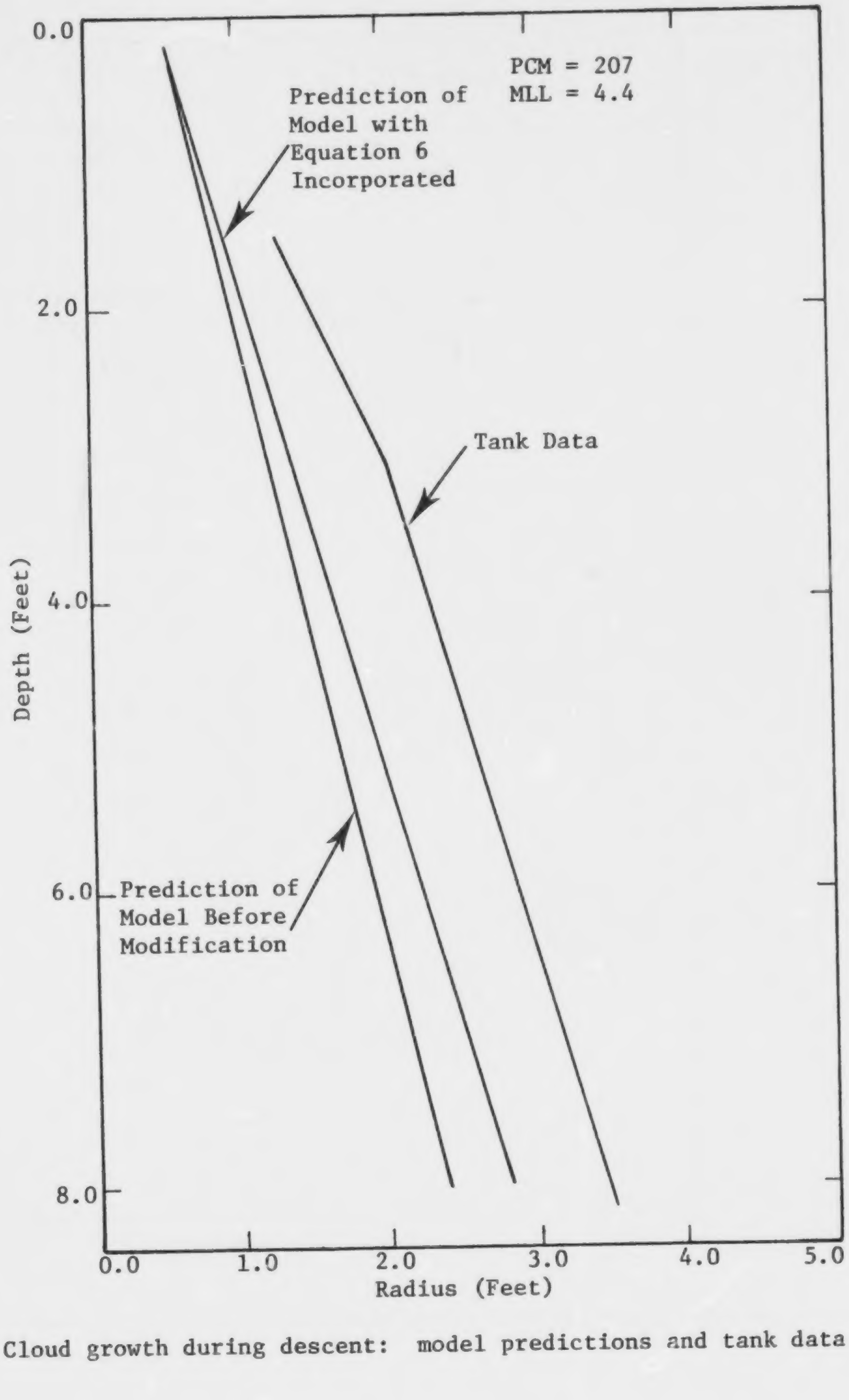


Figure 18. Cloud growth during descent: model predictions and tank data at high MLL.

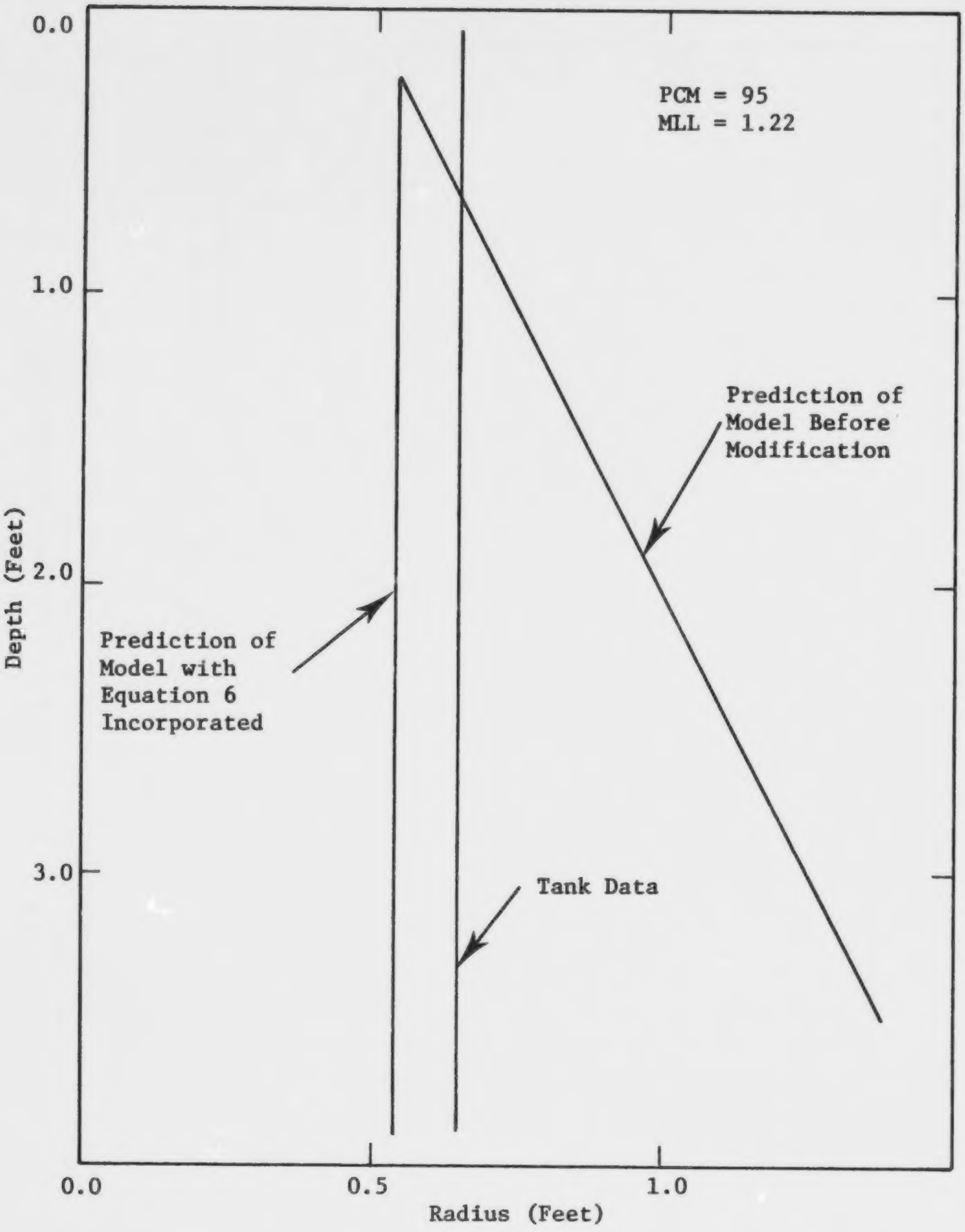


Figure 19. Cloud growth during descent: model predictions and tank data at low MLL.

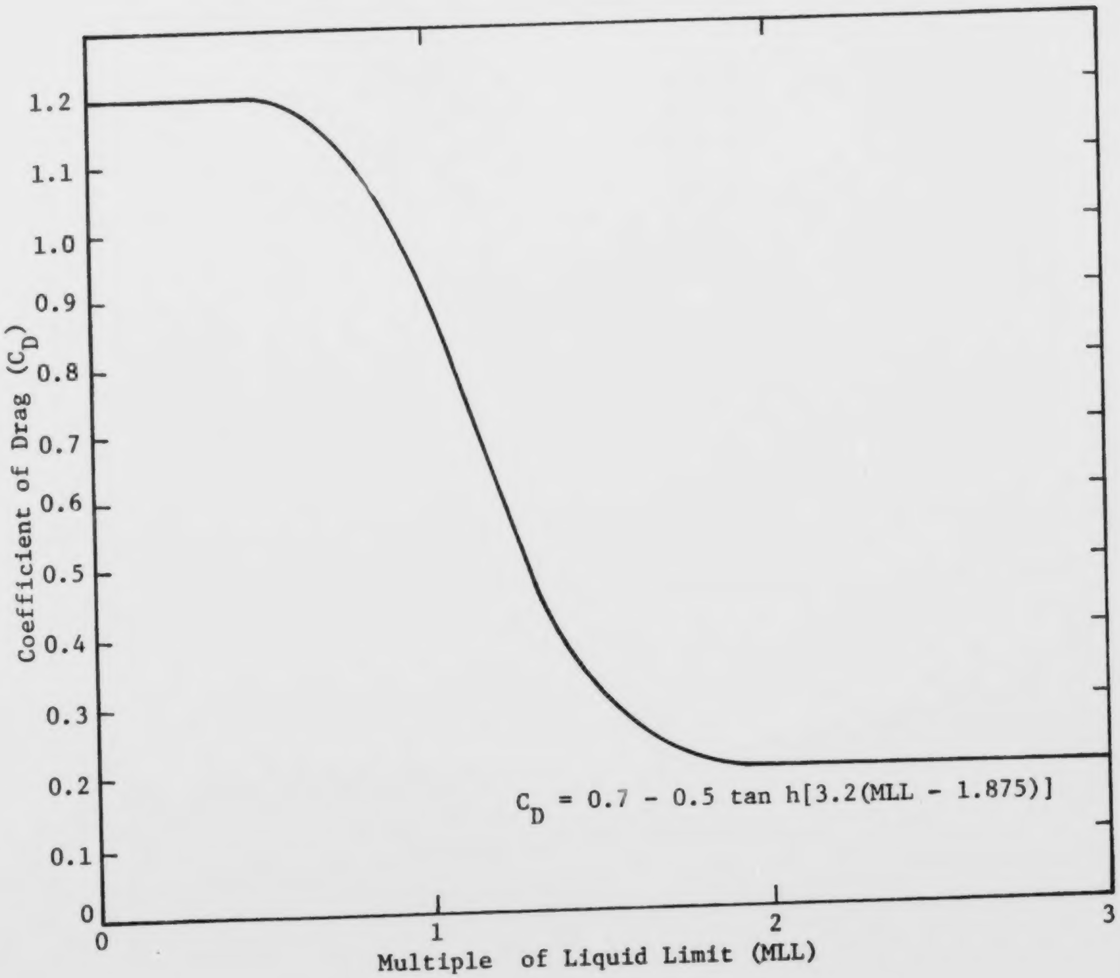


Figure 20. Effect of multiple of liquid limit on drag coefficient.

reach a given depth (Figure 21). However, variation of the added mass coefficient by 33 1/3% produces a 13.6% variation. To improve predictions of centroid depth versus time, the virtual mass coefficient was varied to produce agreement between the model and experimental results.

As a body (or cloud) moves through the water column, it displaces water. The displacement of water results in kinetic energy being present in the fluid. The total kinetic energy of the system can be expressed as:

$$K.E. = 1/2 M_B \overset{>}{V}_B \cdot \overset{>}{V}_B + 1/2 \iiint_{Vol} \rho\, \overset{>}{V} . \overset{>}{V} . d(Vol) + 1/2(M_B + M_A) \overset{>}{V}_B \cdot \overset{>}{V}_B$$

$$= 1/2 C_M M_B \overset{>}{V}_B \cdot \overset{>}{V}_B$$

Where:

$\overset{>}{V}_B$ is the velocity of the falling body

M_B is the mass of the body

M_A is the virtual mass

$\overset{>}{V}$ is the velocity of a fluid particle

ρ is the density of the fluid particle

Vol is the fluid volume

C_M is the virtual mass coefficient

The variation of virtual mass with MLL showed the same form as C_D versus MLL and entrainment versus MLL (Figure 22).

Representative comparisons between centroid depth versus time curves for both the originally suggested Koh-Chang descent parameters and JBF values and experimental values are shown in Figures 23 through 25. The new coefficients resulted in improving the model's predictive capabilities.

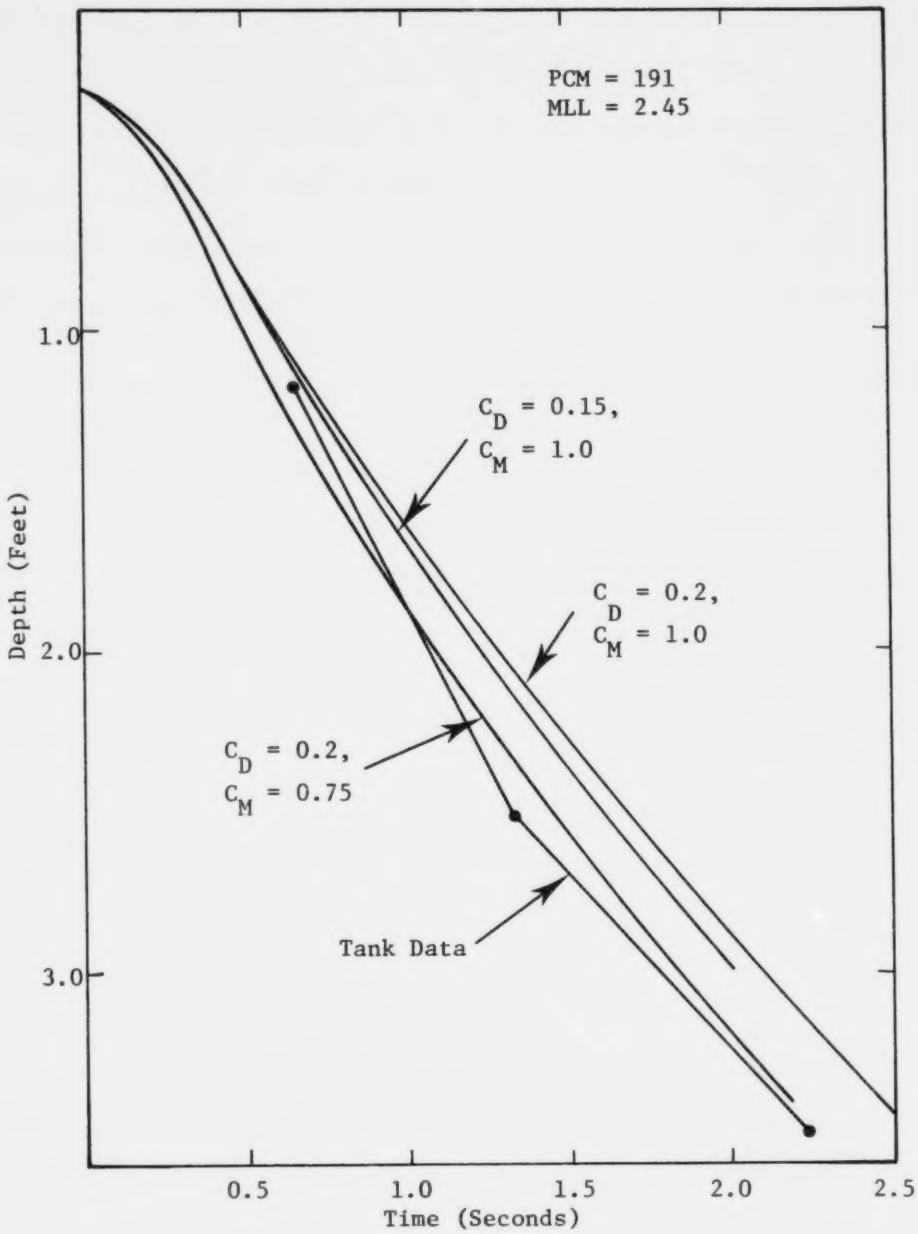


Figure 21. Effect of time on cloud centroid depth for tank tests and various model predictions.

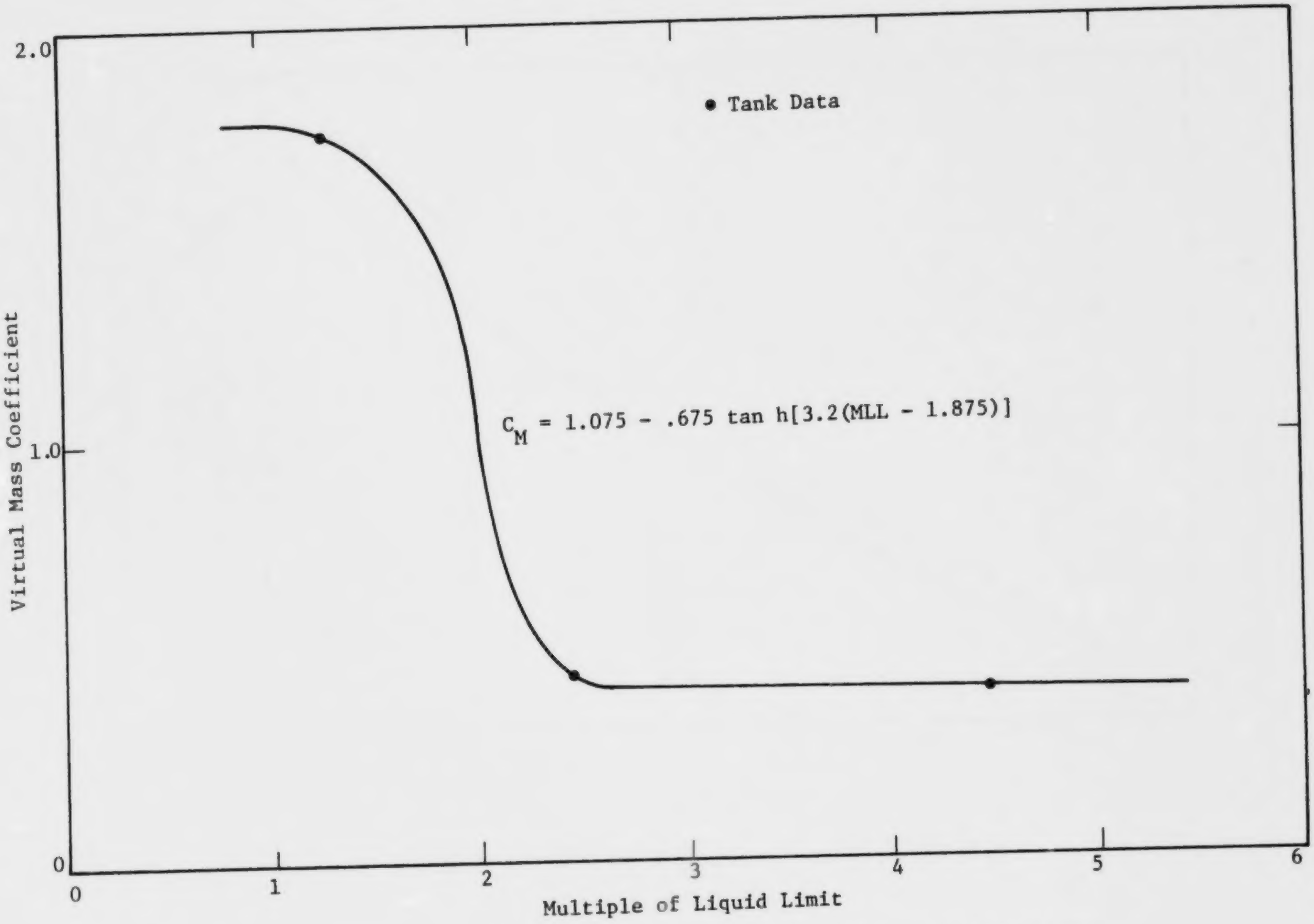


Figure 22. Effect of multiple of liquid limit on virtual mass coefficient.

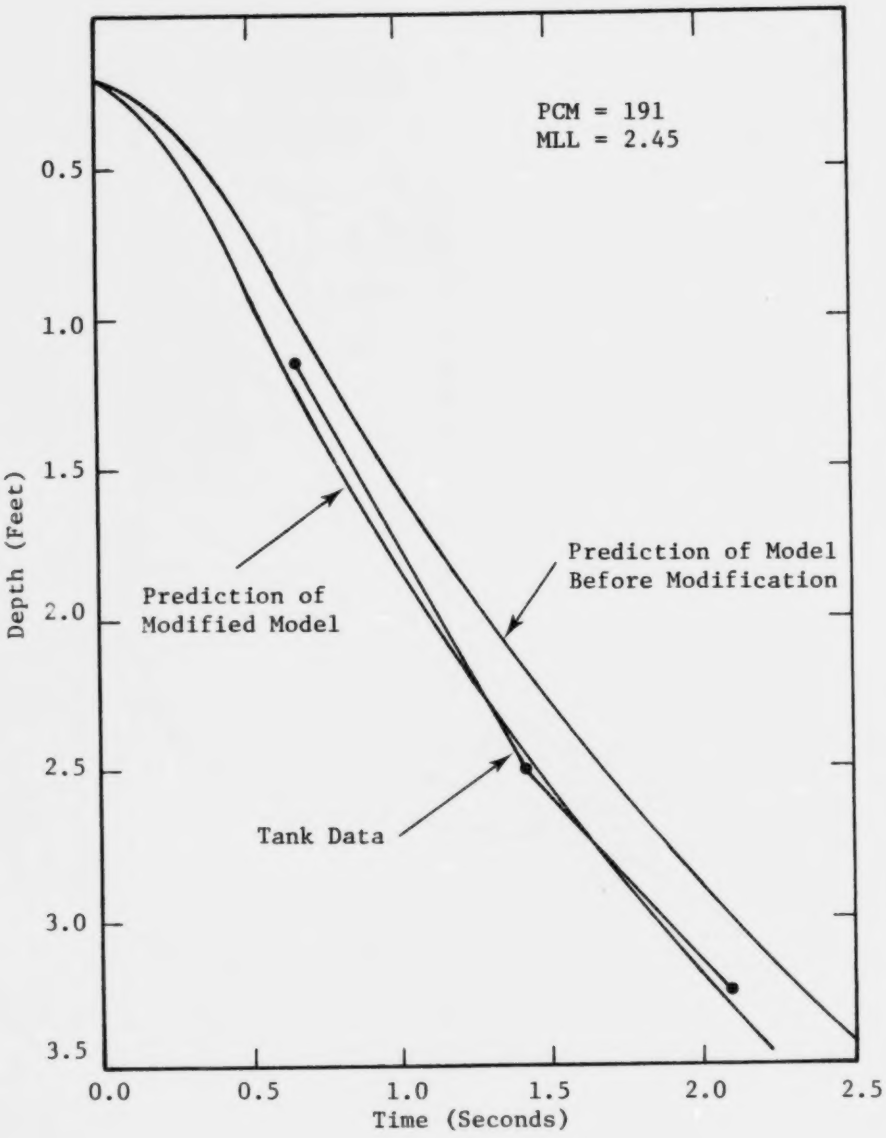


Figure 23. Effect of time on cloud centroid depth: model predictions and tank data at moderate MLL.

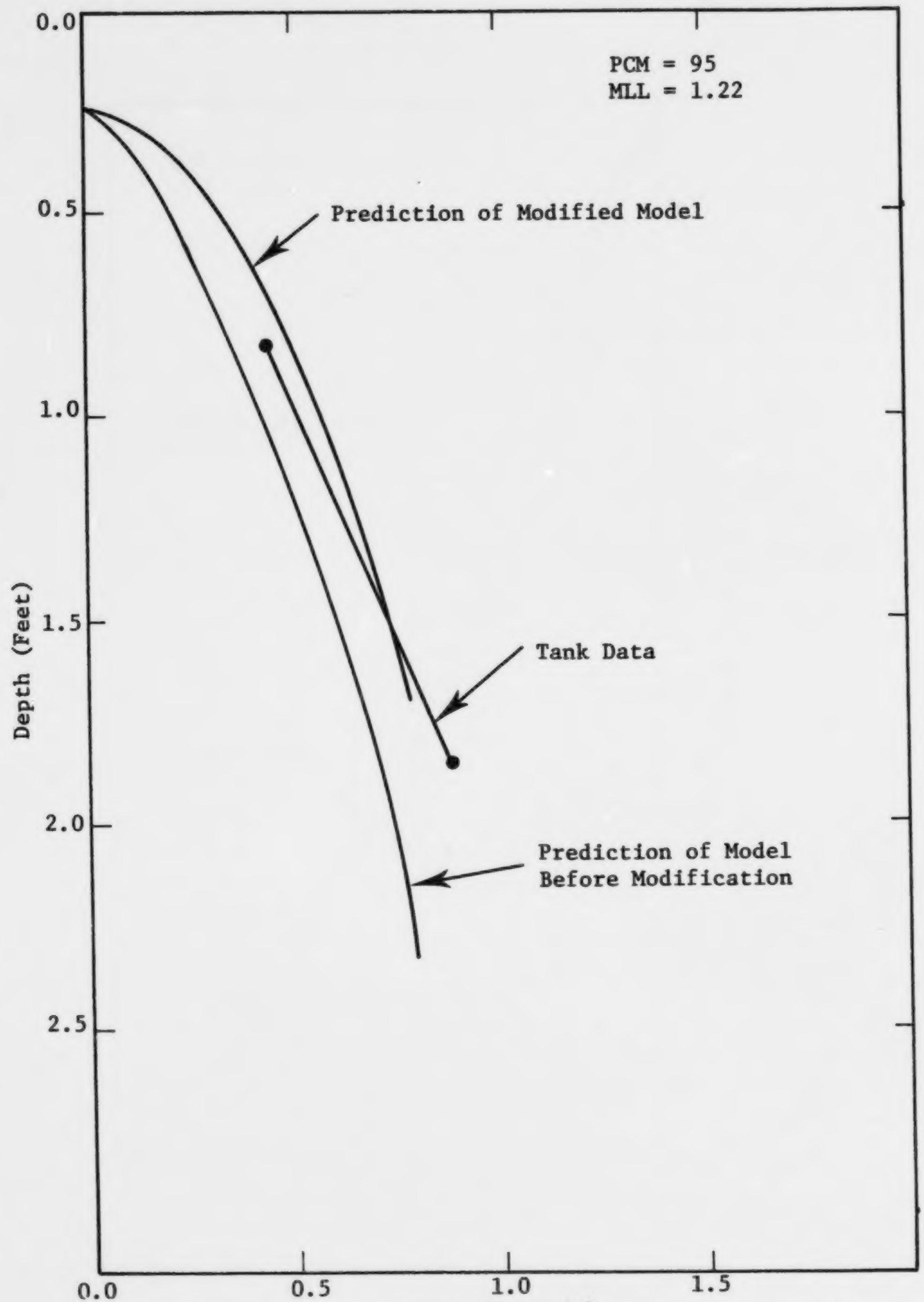


Figure 24. Effect of time on cloud centroid depth: model predictions and tank data at low MLL.

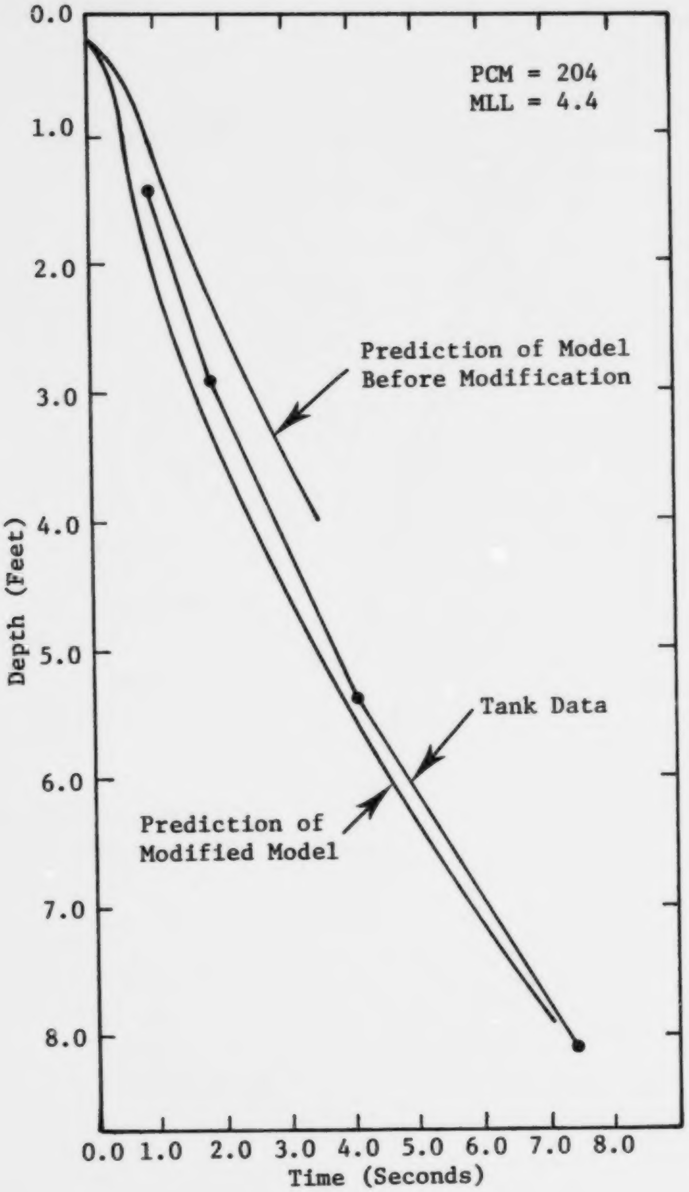


Figure 25. Effect of time on cloud centroid depth: model predictions and tank data at high MLL.

D. MODIFICATION OF DYNAMIC COLLAPSE EQUATIONS

As the cloud of material descends through the water column it gains mass and momentum by the entrainment of fluid. As a consequence the horizontal velocity of the cloud loses its own identity and approaches that of the ambient. The cloud will maintain its vertical velocity until either neutral buoyancy is reached or the bottom is encountered. In either case, the vertical velocity will be driven to zero and the cloud will begin to collapse upon itself while spreading out in the horizontal plane. The program assumes that the cloud's horizontal spreading velocity is always due to the collapse of the cloud. The driving force for collapse is always assumed to be the difference in density gradient between the cloud and the ambient. No consideration is given to transfer of momentum from the vertical to the horizontal upon impact with the bottom.

JBF studied films of laboratory drops of dredged material and compared the horizontal spreading in the tank to that predicted by the model. In all cases the laboratory material spread significantly farther than predicted by the model. Figures 26 and 27 are typical of the results observed. Note that the computer simulation predicted the material to settle within the confines of the tank when in reality the material completely blanketed the tank bottoms and very quickly impacted tank walls. These inconsistencies between laboratory data and simulation results that the program does not adequately model the dynamic behavior of dredged material during the collapse phase.

During some drops observed for comparisons during the collapse phase, the bulk of the material settled out in the immediate vicinity of the impact point. However, a thin turbidity cloud could be seen to propogate

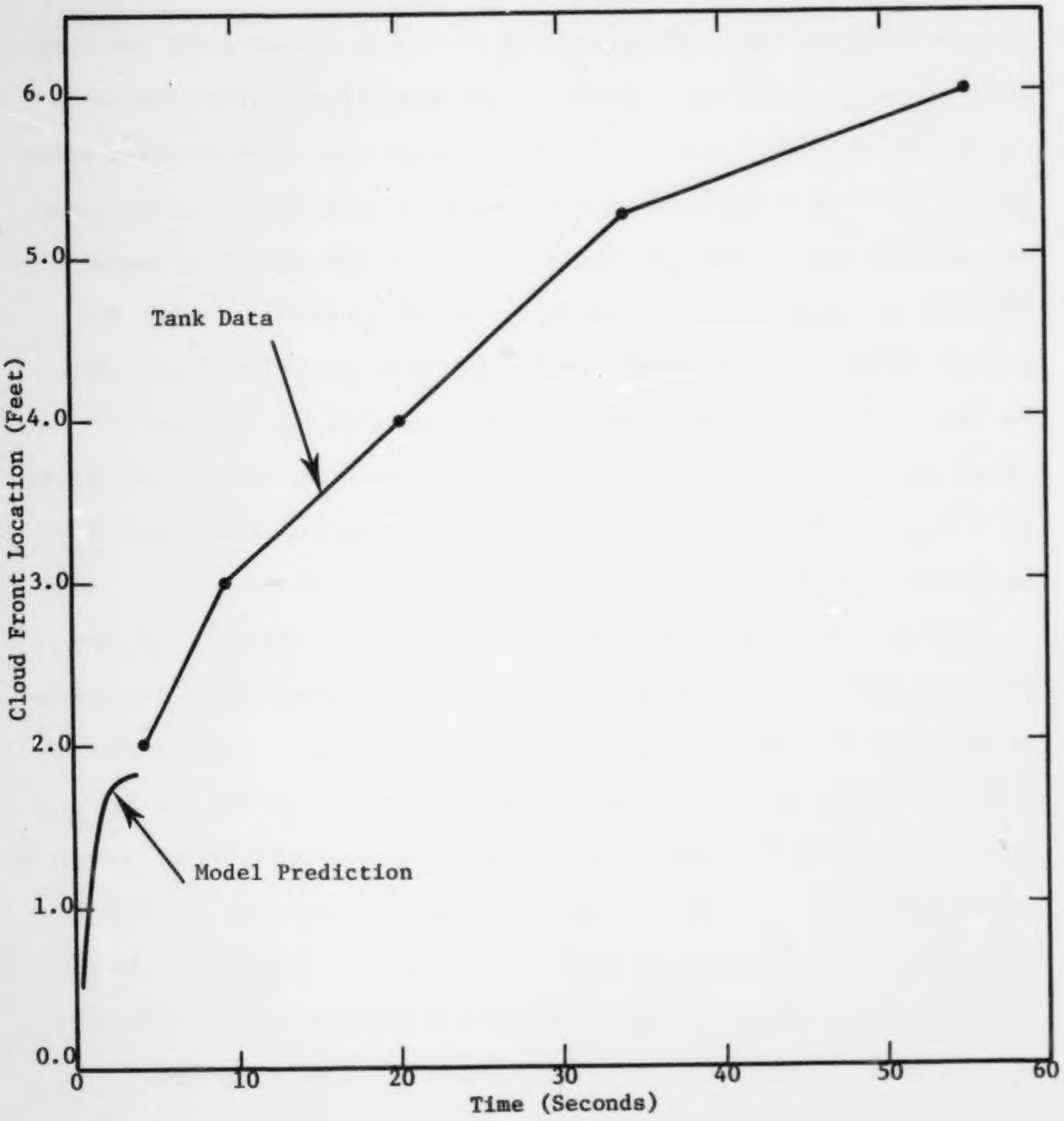


Figure 26. Effect of time on cloud front location for model predictions and tank data.

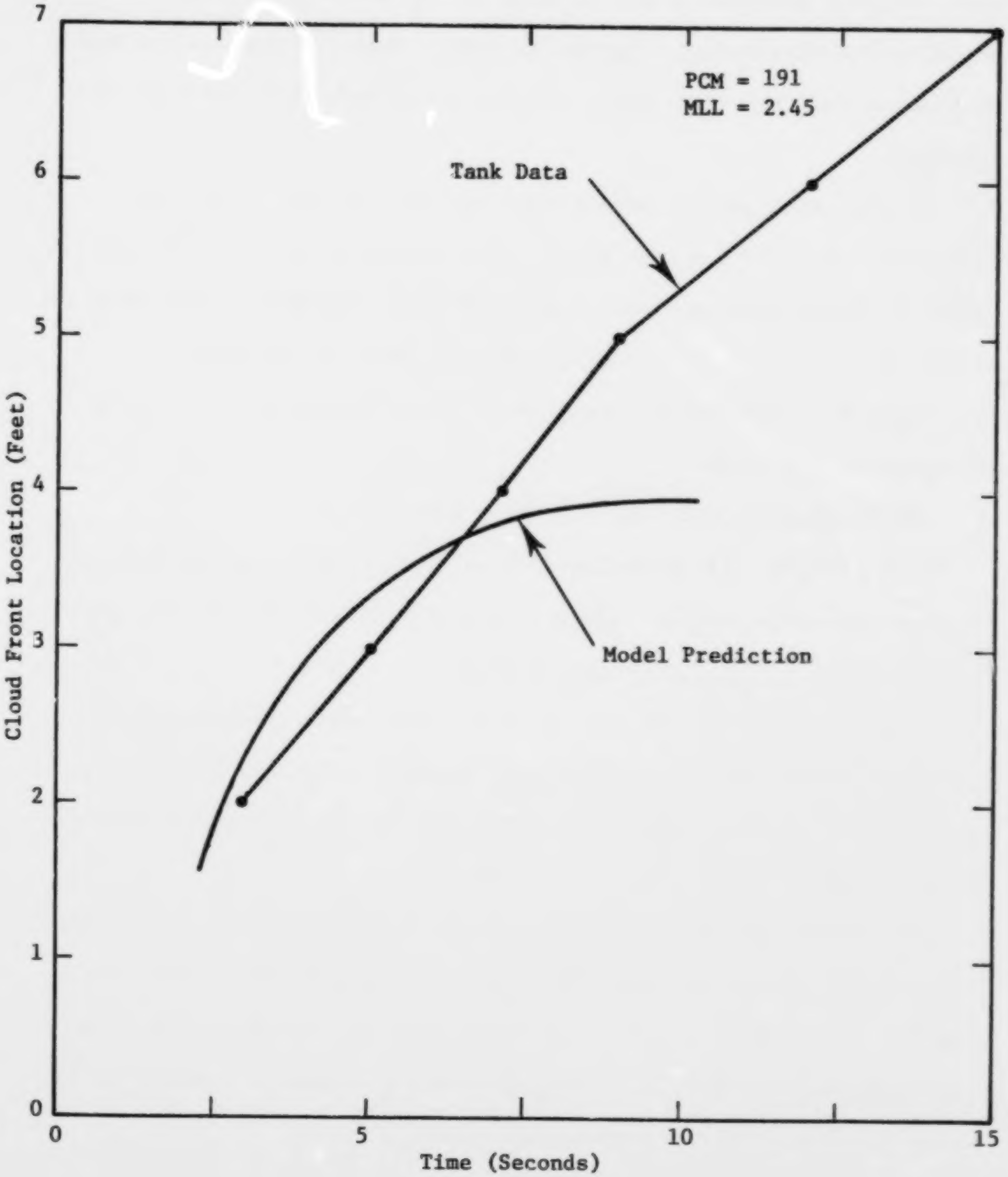


Figure 27. Effect of time on cloud front location for model predictions and tank data.

away from the impact point. This led to speculation that, perhaps, a dense mud flow occurred in the vicinity of the impact point, and was masked by the surrounding, lighter turbidity cloud. No conclusions could be drawn on this important point, because no concentration profiles were available.

An additional problem encountered was that, in many cases, the collapsing cloud hit the tank walls. This artificially terminated the extent of the collapsing cloud in the tank, and limited the usefulness of the tank data in calibrating the collapse phase of the model.

These data shortcomings precluded a reformulation of the collapse phase during this study.

E. MODIFICATION OF LONG TERM DIFFUSION EQUATIONS

Silt and clay size particles tend to clump together due to interparticle attractive forces. These forces are ionic in nature, and are more prevalent in salt water than in fresh.

Clumps, or flocules of fine sediment, have fall velocities which are higher than those of the individual particles. As the particles begin to floc together, the fall velocity of the finer particles will change to those of the many-particle flocs.

The WES version of the Koh-Chang model made no provision for variations in fall velocity. Only one fixed fall velocity was allowed for a sediment component. However, the CERL version of the model allows the user to select a single fall velocity for each sediment component, or to select a concentration-dependent fall velocity.

The value of fall velocity for a given concentration is found from an analytical function generator (Figure 28). This function generator,

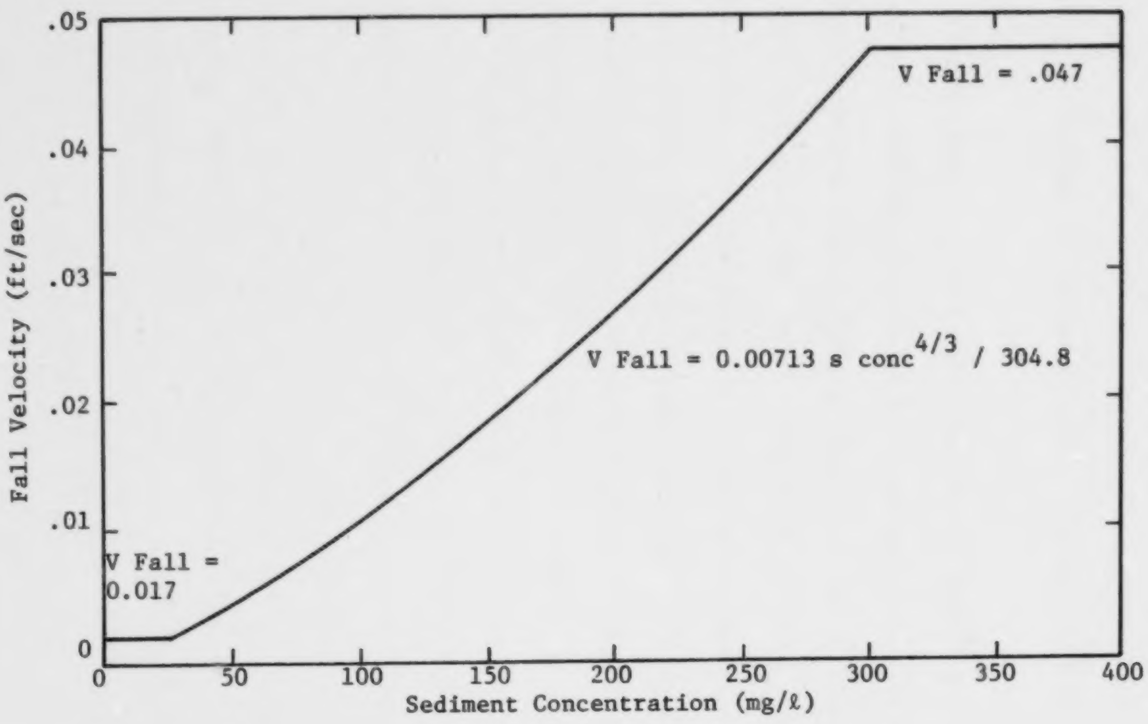


Figure 28. Effect of concentration on fall velocity for a representative cohesive sediment.

developed by WES and incorporated into the latest version of the program is intended to be representative. The generator follows a 4/3 power law dependence of fall velocity on concentration. This relationship has been found to be valid over a wide variety of cases, but the actual upper and lower limits of fall velocity will depend on the individual sediment type.

In general, the surest way to ascertain that the long term diffusion phase properly models settling would be to extract sediment from the proposed dredged material, and ascertain the fall velocities of the sediment components in water from the dump site. These fall velocities will vary from sediment to sediment, and will be a function of concentration of sediment, minerological properties, water salinity and temperatures, etc.

Since no general fall velocity-concentration relation exists for cohesive sediments, no attempt was made to modify the WES equations in the model. They are included in the CERL model as an example of the state-of-the-art, but should not be taken as a universal model of fall velocity for cohesive sediments until verification is accomplished.

F. MODEL OUTPUT SIMPLIFICATIONS

Modifications to the output format parallel those of the input format. Hence, there are now two versions of output format selected by the same key which selects the input format. A complete discussion of options available, input requirements and examples of use are found in ref. (3).

On the first, or long version, the output format remains nearly identical to that employed formerly in the model as developed for WES. A full range of options is available in this version, and the user must be familiar with the model structure as well as the ambient and dredged material characteristics to properly exercise these options. A typical listing of output produced from this version is shown in Appendix A.

The second, or short version, allows the user to exercise most of the options relating to material and ambient characteristics while simplifying the printout. This version corresponds to the simplified input format detailed previously. Output consists of a single-page printout of input data values, followed by graphs of material during convection descent and collapse. Next, the long term diffusion results are shown in tabular form for each long term time step. For user convenience, the contributions of individual components are summed, and only the total contribution is shown. A typical listing is shown in Appendix B.

SECTION 4

MODEL VERIFICATION

Calibration of the model, as described in Section 3, was performed to ensure the best fit between model results and existing tank test data. However, the ability of the model to predict the behavior of an instantaneously discharged cloud of dredged material had not been verified.

In order to perform a verification of the model's predictive capability, the model results were compared against tank test data which had not been used in the calibration process. The comparison procedure was identical to that used in Section 3, i.e. the cloud size was plotted against depth, and the slopes of the resultant curves examined to determine agreement in entrainment coefficient. The cloud depth was then plotted against time, and these slopes compared for agreement in velocity, which was governed by the drag and virtual mass coefficients.

Agreement between the model prediction, based on the data put forth in Section 3, and these independent tank test data verified that the predictive capability of the model had been improved. Although the data used for verification were independently developed, the simulated environment of laboratory tanks was the same for calibration and verification. Field verification remains necessary.

Figures 29 to 32 compare the program results after the changes detailed in Section 3 were implemented to the results made using the original model and to tank tests made with Fall River and Thames River sediment. For high PCM material figures 29 and 30 show that the model exhibits a nominal improvement in its ability to predict cloud velocity

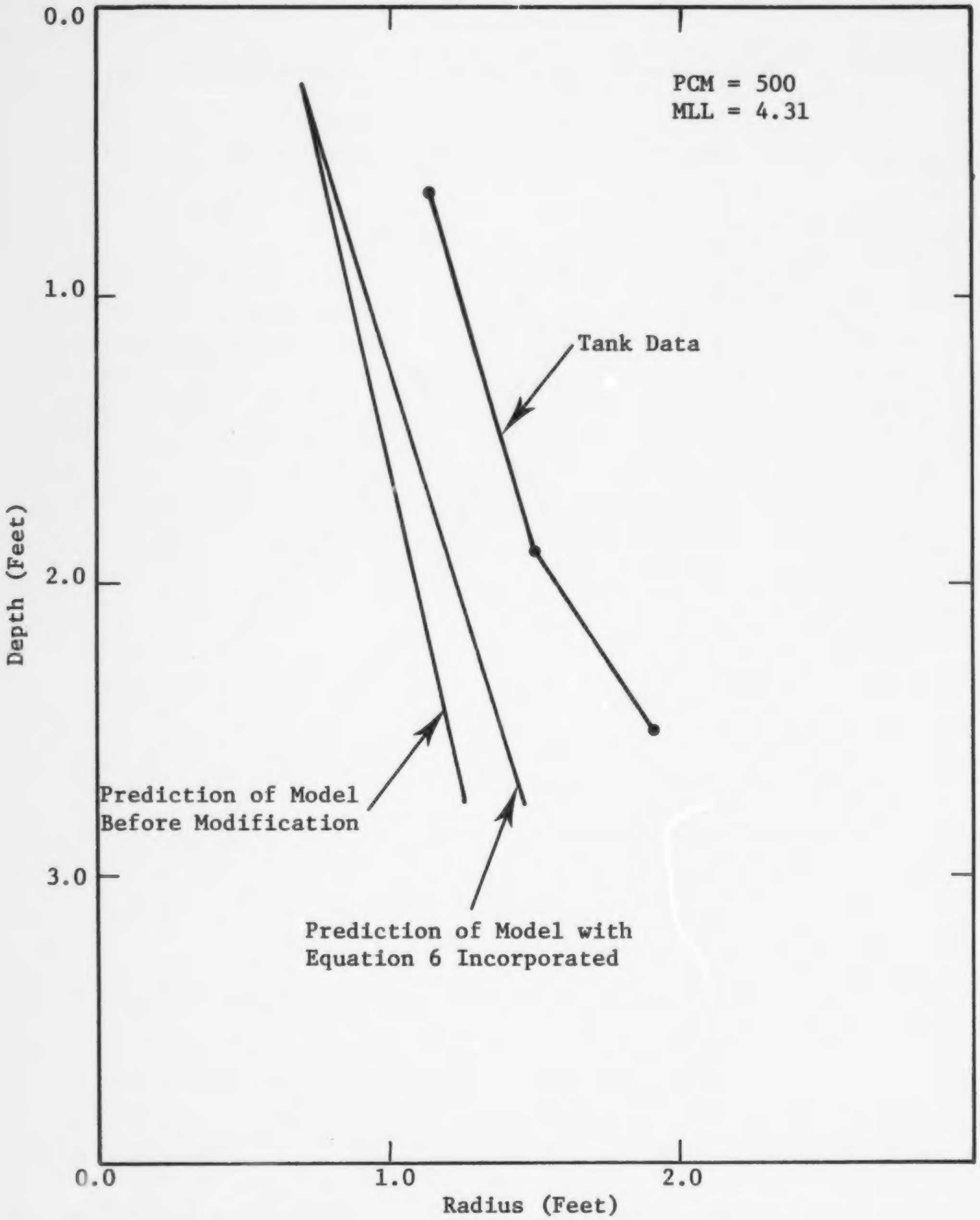


Figure 29. Verification of model entrainment predictions at high MLL: modified and unmodified model predictions and Fall River silt tank test data.

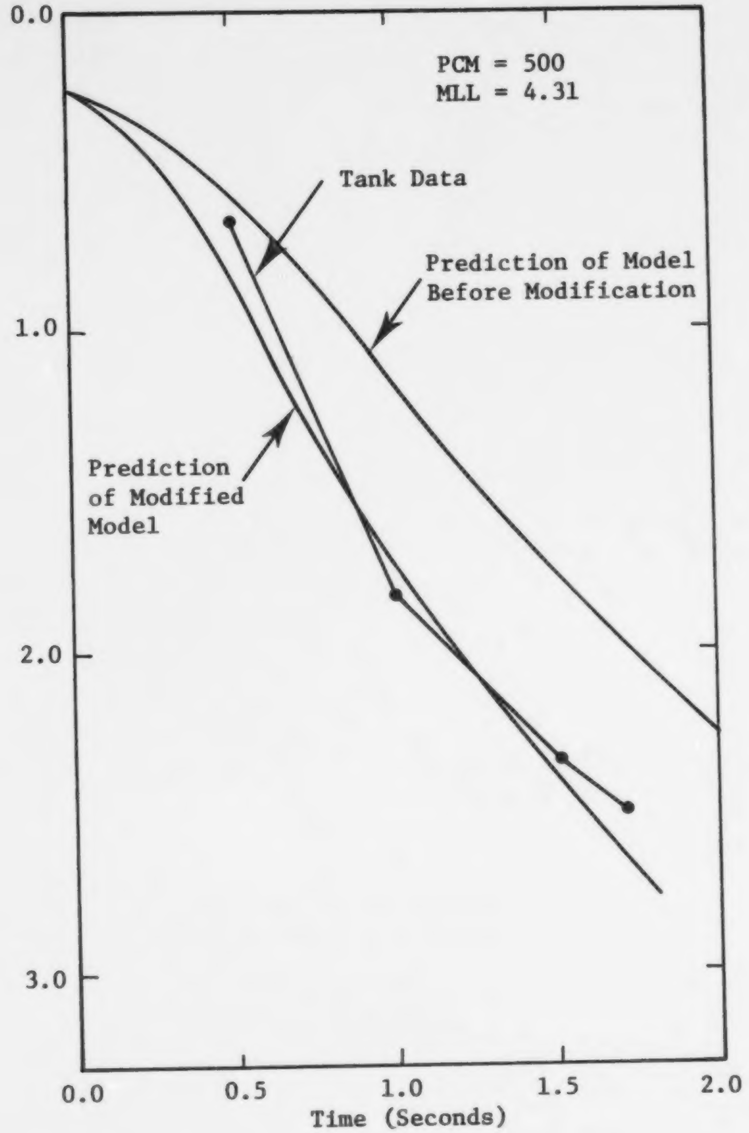


Figure 30. Verification of model velocity predictions at high MLL: modified and unmodified model predictions and Fall River silt tank test data.

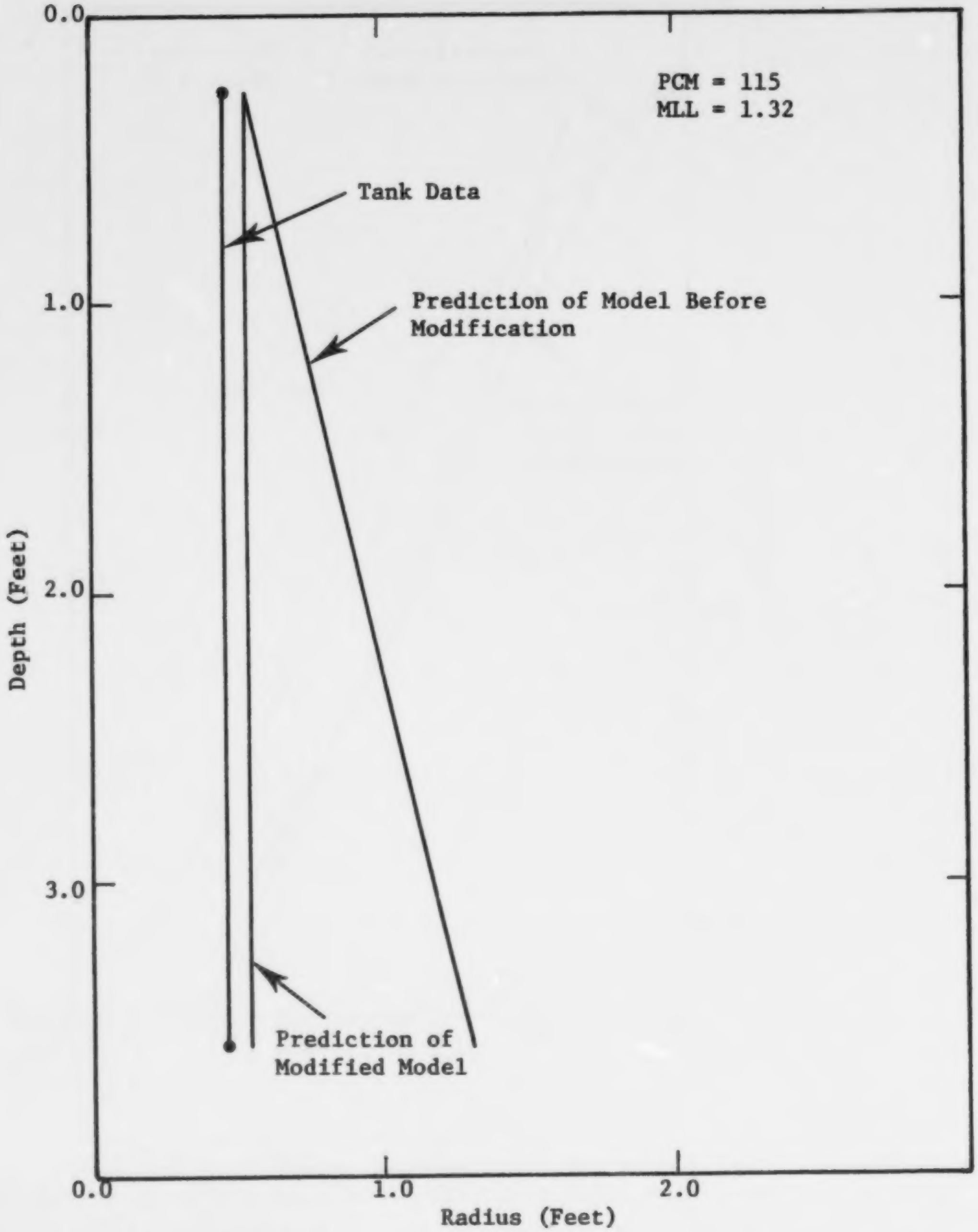


Figure 31. Verification of model entrainment predictions at low MLL: modified and unmodified model predictions and Thames River silt tank test data.

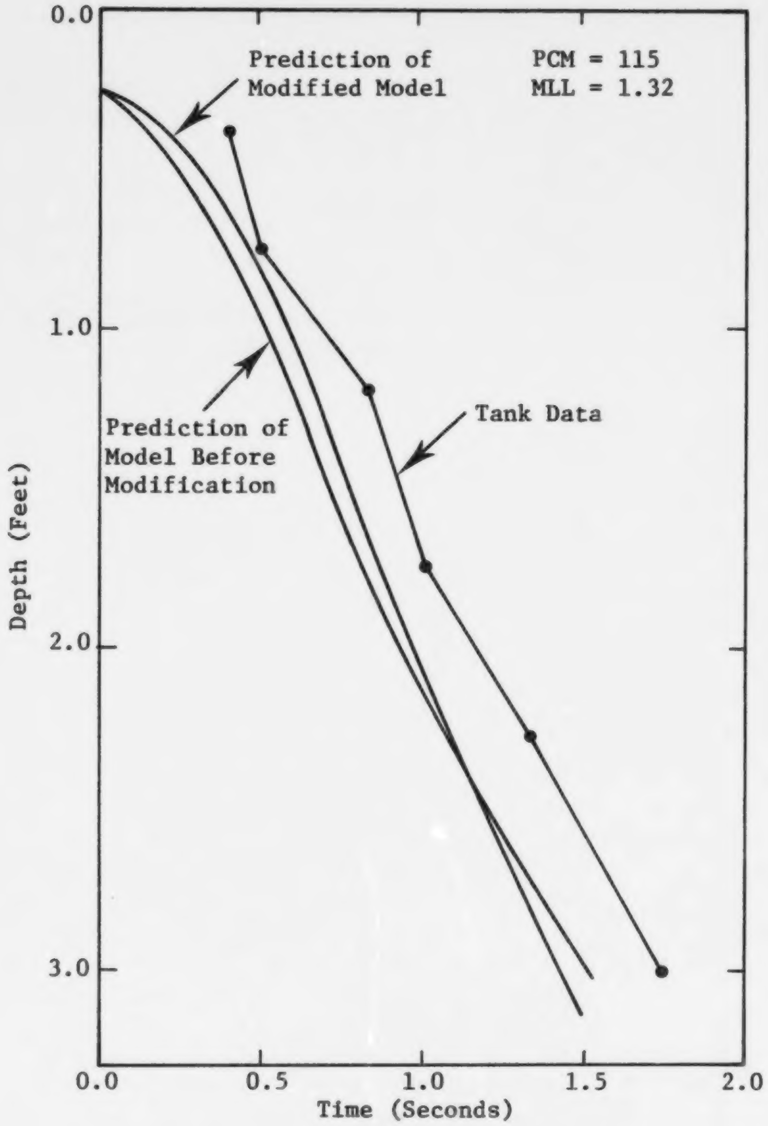


Figure 32. Verification of model velocity predictions at low MLL: modified and unmodified model predictions and Thames River silt tank test data.

and size. However, the model exhibits a vastly improved velocity predictive capability for low PCM drops (figures 31 and 32). The reason for the great improvement for low PCM drops can be traced to the original model's assumed constant value for entrainment regardless of material properties.

For high PCM drops the output results did not vary greatly with PCM since the material was acting like a liquid cloud and the assumed entrainment coefficient was close to that for a liquid cloud. However, for low PCM drops the material acts more like a solid and drops rapidly to the bottom. Unless the user specifically knows how to calculate the entrainment coefficient for his particular material he could experience results significantly in error when trying to exercise the program. The new program requires liquid limit (a material property) as an input and calculates the entrainment coefficient internally. As can be seen from the figures, significant improvements in the program capabilities can be realized by accurately modeling entrainment.

An actual listing of the computer program has not been included in this report due to its length. Those interested may obtain a listing by writing the Corvallis Research Laboratory, Corvallis, Oregon, 97330 for CERL report 047.

SECTION 5

CONCLUSIONS AND RECOMMENDATIONS

The changes made to the latest version of the Koh-Chang model have produced better agreement between model predictions and laboratory tank test data during the convective descent phase.

In addition to the laboratory test data, the above changes should be verified against field data. One possible shortcoming of the laboratory data may be the shallow depth. Since most of the drops were in only 4 feet of water, average values of entrainment, drop, and added mass were calculated for the entire run. In very deep water, where the moisture content of the material undergoes a pronounced change, the governing coefficients may also undergo a change with depth.

Due to the small bottom area of the test tanks used, little work was done on the collapse phase. However, it was evident in most of the drops observed that the material hit the bottom with considerable velocity, and also considerable excess buoyancy. The model assumes that the same conditions hold for collapse whether it occurs in the water column or on the bottom. These conditions include neutral buoyancy, and hence a driving force due to the difference in density gradient between the cloud and the ambient. In actuality, it appears that the density difference may be the driving force during collapse on the bottom. This may require modification to the model, and will certainly require laboratory and field testing.

A function generator for fall velocity vs. concentrations for cohesive particles has been incorporated into the model. This function generator is intended to be exemplary, and should not be considered universal. The user should plan, if possible, to make settling tests on cohesive particles of the material to be dredged, using water from the dump site as the aqueous medium. Care should be taken in choosing the long term grid step size, and time step for long term diffusion. Knowledge of the turbulent structure of the water column is necessary to make an accurate estimate of these quantities. The program considers any eddies smaller than a grid spacing in size as part of the background turbulence. Hence, the grid spacing should be equal to the maximum turbulent eddy size to be expected at the dump site. In addition, given a characteristic velocity U and grid spacing size L for the turbulent flow field, the time step should be selected as:

$$T = L/U$$

in order to produce the most accurate calculations during long term diffusion. This phase also needs extensive laboratory and field verification.

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2. Brandsma, M.G. and Divoky, D.J., "Development of Models for Prediction of Short-Term Fate of Dredged Material Discharged in The Estuarine Environment," Contract Report D-76-5, May 1976, U.S. Army Engineer Waterways Experiment Station, Vicksburg, Mississippi.

3. Goldenblatt, M., Bowers, G., and Davis, L.R., "Workbook/User's Manual, Prediction of Instantaneously Dumped Dredged Material," Corvallis Environmental Research Laboratory, U.S. EPA, to be published.

4. JBF Scientific Corporation, "Dredging Technology Study - San Francisco Bay and Estuary," Contract Report DACW07-75-C-0045, San Francisco District, U.S. Army Corps of Engineers, San Francisco, California, 94102.

5. Unpublished waterways Experiment Station Data.

APPENDIX A

EXAMPLE OF MODEL EXECUTION - LONG VERSION

This appendix contains a tabulation typical of that which would be obtained from exercising the complete output file version of the model. A full range of input/output options is available for use if this version is selected.

Output generated for this version of the modified model consists of an echo of the required input data, followed by tabular and/or graphical data representing material location and dynamics during the three phases of simulation: convective descent, collapse, and long term diffusion. The reader is referred to the user's manual (3) for a full explanation of all possible inputs required.

During the convective descent simulation, tabular information detailing the deployment of the sediment cloud and its dynamics and/or a graph of cloud size, centroid depth, and horizontal position may be selected as output. Graphs of concentrations may be selected as additional output during this phase. The simulation may, if the user desires, be terminated at the end of the convective descent phase.

Output selection options during the collapse phase are similar to those present in convective descent. Tabular and/or graphical data and extra graphs of concentrations are available.

Long term diffusion output follows the history of each individual sediment component during the passive diffusion phase. First, the transition from short-term simulation to long-term diffusion is detailed by tabulation of the small clouds created to simulate diffusion of each component. Next, at each long-term time step, the amount of material still in the water column, in the long term grid, and remaining in the small clouds as well as the amount of material deposited on the bottom are all tabulated.

Plots of bottom accumulations of sediment, thickness of bottom accumulation, concentration of material (or fluid) remaining in the cloud, thickness of the cloud, and position of the cloud top surface for each grid square are presented at each selected print time. If no selection is made, the plots are made at four equal time increments during the run. Finally, at the end of the simulation the total thickness and total of all accumulated volume in each long-term grid square are plotted.

```
STORAGE ALLOCATION PARAMETERS FOLLOW...
NMAX MMAX   NS  NVL  NSC    NEED
 31   31     4   1   20       0
```

EXAMPLE OUTPUT OF MODEL EXECUTION - LONG VERSION (1 of 61)

```
DEPTH GRID FOLLOWS...

  M N=     1     2     3     4     5     6     7     8     9    10    11    12    13    14    15    16    17    18    19    20    21    22    23    24
     1    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.
     2    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.
     3    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.
     4    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.
     5    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.
     6    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.
     7    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.
     8    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.
     9    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.
    10    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.
    11    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.
    12    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.
    13    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.
    14    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.
    15    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.
    16    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.
    17    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.
    18    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.
    19    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.
    20    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.
    21    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.
    22    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.
    23    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.
    24    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.
    25    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.
    26    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.
    27    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.
    28    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.
    29    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.
    30    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.
    31    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.
```

EXAMPLE OUTPUT OF MODEL EXECUTION - LONG VERSION (2 of 61)

```
FATE OF DREDGED MATERIAL DEPOSITED IN AN ESTUARY BY DUMPING

----------------------------------------------------------------

EXECUTION PARAMETERS FOLLOW...
KEY1  KEY2  KEY3  KEY4  IGCN  IGCL  IPCN  IPCL  IPLT  IDEP
  2     3     0     0     1     1     1     1     0     1
     VERIFICATION RUN -- FALL RUVER SILT -- 500 PPM

----------------------------------------------------------------

NUMBER OF LONG TERM GRID POINTS IN Z-DIRECTION (NMAX) =  31

NUMBER OF LONG TERM GRID POINTS IN X-DIRECTION (MMAX) =  31

GRID SPACING (DX) =      2.00000
```

EXAMPLE OUTPUT OF MODEL EXECUTION - LONG VERSION (3 of 61)

```
 M N=25.  26.  27   28.  29.  30.  31.
 1    4.   4.   4.   4.   4.   4.   4.
 2    4.   4.   4.   4.   4.   4.   4.
 3    4.   4.   4.   4.   4.   4.   4.
 4    4.   4.   4.   4.   4.   4.   4.
 5    4.   4.   4.   4.   4.   4.   4.
 6    4.   4.   4.   4.   4.   4.   4.
 7    4.   4.   4.   4.   4.   4.   4.
 8    4.   4.   4.   4.   4.   4.   4.
 9    4.   4.   4.   4.   4.   4.   4.
10    4.   4.   4.   4.   4.   4.   4.
11    4.   4.   4.   4.   4.   4.   4.
12    4.   4.   4.   4.   4.   4.   4.
13    4.   4.   4.   4.   4.   4.   4.
14    4.   4.   4.   4.   4.   4.   4.
15    4.   4.   4.   4.   4.   4.   4.
16    4.   4.   4.   4.   4.   4.   4.
17    4.   4.   4.   4.   4.   4.   4.
18    4.   4.   4.   4.   4.   4.   4.
19    4.   4.   4.   4.   4.   4.   4.
20    4.   4.   4.   4.   4.   4.   4.
21    4.   4.   4.   4.   4.   4.   4.
22    4.   4.   4.   4.   4.   4.   4.
23    4.   4.   4.   4.   4.   4.   4.
24    4.   4.   4.   4.   4.   4.   4.
25    4.   4.   4.   4.   4.   4.   4.
26    4.   4.   4.   4.   4.   4.   4.
27    4.   4.   4.   4.   4.   4.   4.
28    4.   4.   4.   4.   4.   4.   4.
29    4.   4.   4.   4.   4.   4.   4.
30    4.   4.   4.   4.   4.   4.   4.
31    4.   4.   4.   4.   4.   4.   4.
```

EXAMPLE OUTPUT OF MODEL EXECUTION - LONG VERSION (4 of 61)

```
CODED ARRAY FOLLOWS...

RANGE OF N IS   1 TO  31

3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3
3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 3
3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 3
3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 3
3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 3
3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 3
3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 3
3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 3
3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 3
3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 3
3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 3
3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 3
3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 3
3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 3
3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 3
3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 3
3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 3
3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 3
3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 3
3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 3
3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 3
3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 3
3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 3
3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 3
3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 3
3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 3
3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 3
3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 3
3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 3
3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 3
3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3


NUMBER OF GRID POINTS WITHIN ESTUARY =   841
```

EXAMPLE OUTPUT OF MODEL EXECUTION - LONG VERSION (5 of 61)

```
BARGE COORDINATES...
XBARGE (FT) =    30.00        ZBARGE (FT) =    33.00

                ---AMBIENT CONDITIONS---

     DEPTH (FT)        0.          4.000
AMBIENT
DENSITY (GM/CC)       1.000       1.000


INTERPOLATED DEPTH AT DUMP COORDINATES, H =    4.000    FT.

--------------------------------------------------------------------------------


TWO VELOCITY PROFILES SPECIFIED IN X AND Z DIRECTIONS FOR --QUICK LOOKS--
DEPTH ASSUMED CONSTANT AND VELOCITIES CONSIDERED STEADY IN TIME
VELOCITY PROFILE PARAMETERS FOLLOW...
DU1 =     1.00     DU2 =     2.00     UU1 =     0.       UU2 =     0.
DW1 =     1.00     DW2 =     2.00     WW1 =     0.       WW2 =     0.


TIME PARAMETERS FOLLOW...
TIME OF DUMP =        0.00 SECONDS AFTER START OF TIDAL CYCLE
DURATION OF SIMULATION =      600.00 SECONDS AFTER DUMP
LONG TERM TIME STEP (DTL) =       15.00 SECONDS


DISCHARGE PARAMETERS...
INITIAL RADIUS OF CLOUD, RB =     .5668000
INITIAL DEPTH OF CLOUD CENTROID, DREL =     .2500
INITIAL CLOUD VELOCITIES...CU(1) =     0.          CV(1) =     0.          CW(1) =     0.

BULK PARAMETERS...
DENSITY, ROO =     1.113000
AGGREGATE VOIDS RATIO, BVOID =     .7800
LIQUID LIMIT =     116.0
AVERAGE SPECIFIC GRAVITY =     2.550


THERE ARE  4 SOLIDS,  PARAMETERS FOLLOW.......
```

EXAMPLE OUTPUT OF MODEL EXECUTION - LONG VERSION (6 of 61)

```
DESCRIPTION  DENSITY(GM/CC)  CONCENTRATION(CUFT/CUFT)  FALL VELOCITY(FT/SEC)   VOIDS RATIO

 100-90        2.560              .7246E-02                 .4000E-01       .7900
 90-80         2.560              .7246E-02                 .2500E-01       .7900
 80-30         2.560              .3623E-01                 .1330E-01       .7900
  .LT. 30      2.560              .2174E-01                 .5000E-03       .7900
 FLUID         1.000              .9275                     0.

PERCENT MOISTURE CONTENT =   500.0280,    4.3105    TIMES LIQUID LIMIT
CALCULATED ENTRAINMENT COEFFICIENT =    .291954
```

EXAMPLE OUTPUT OF MODEL EXECUTION - LONG VERSION (7 of 61)

```
[illegible]
ALPHA0    .2350 BETA    0.0000 CM    1.0000 CD    .5000
GAMA      .25   CDRAG   1.00   CFRIC  .010  CD3   .10 CD4  1.00 ALPHAC    .0010
FRICTN    .0100 F1      .1000
ALAMDA    .0050 AKYO     .0500
```

EXAMPLE OUTPUT OF MODEL EXECUTION - LONG VERSION (8 of 61)

```
  CONVECTIVE DESCENT

  COMPUTATIONAL INDICATORS FOLLOW...

  NTRIAL          DT          IPLUNG NUTRL ISTEP
     1   .18829015               1     0    19
     2   .23850033E-01           1     0   143

  X AND Z ARE MEASURED W/R TO BARGE POSITION

 TIME     X        Y       Z     U      V      W       DEN-DIF   RADIUS  DIA   VORT.    FLUID CONC.  SOLID-VO..  CONCENTRATION
 0.00    0.00     .25    0.00  0.00  0.000  0.00   .1130E+00    .67   1.33  0.0000   .9275E+00   .4499E-02   .7245E-02
                                                                                                .4499E-02   .7245E-02
                                                                                                .2250E-01   .3623E-01
                                                                                                .1350E-01   .2174E-01
  .05    0.00     .25    0.00  0.00   .155  0.00   .1125E+00    .67   1.34  0.0000   .9233E+00   .4491E-02   .7203E-02
                                                                                                .4499E-02   .7215E-02
                                                                                                .2249E-01   .3608E-01
                                                                                                .1350E-01   .2165E-01
  .10    0.00     .26    0.00  0.00   .306  0.00   .1112E+00    .67   1.34  0.0000   .9133E+00   .4491E-02   .7122E-02
                                                                                                .4498E-02   .7133E-02
                                                                                                .2249E-01   .3567E-01
                                                                                                .1350E-01   .2140E-01
  .14    0.00     .28    0.00  0.00   .449  0.00   .1091E+00    .67   1.35  0.0000   .8962E+00   .4491E-02   .6983E-02
                                                                                                .4499E-02   .6993E-02
                                                                                                .2249E-01   .3503E-01
                                                                                                .1350E-01   .2100E-01
  .19    0.00     .31    0.00  0.00   .580  0.00   .1064E+00    .68   1.36  0.0000   .8735E+00   .4491E-02   .6812E-02
                                                                                                .4499E-02   .6822E-02
                                                                                                .2249E-01   .3412E-01
                                                                                                .1350E-01   .2047E-01
  .24    0.00     .34    0.00  0.00   .697  0.00   .1031E+00    .69   1.37  0.0000   .8465E+00   .4491E-02   .6601E-02
                                                                                                .4499E-02   .6611E-02
                                                                                                .2249E-01   .3305E-01
                                                                                                .1350E-01   .1984E-01
  .29    0.00     .37    0.00  0.00   .801  0.00   .9940E-01    .70   1.39  0.0000   .8162E+00   .4491E-02   .6364E-02
                                                                                                .4498E-02   .6374E-02
                                                                                                .2249E-01   .3183E-01
                                                                                                .1350E-01   .1913E-01
  .33    0.00     .41    0.00  0.00   .889  0.00   .9545E-01    .71   1.41  0.0000   .7837E+00   .4491E-02   .6111E-02
                                                                                                .4499E-02   .6121E-02
                                                                                                .2249E-01   .3061E-01
                                                                                                .1350E-01   .1837E-01
  .38    0.00     .46    0.00  0.00   .963  0.00   .9135E-01    .72   1.43  0.0000   .7500E+00   .4491E-02   .5843E-02
                                                                                                .4499E-02   .5853E-02
                                                                                                .2249E-01   .2923E-01
                                                                                                .1350E-01   .1759E-01
  .43    0.00     .51    0.00  0.00  1.024  0.00   .8721E-01    .73   1.45  0.0000   .7160E+00   .4491E-02   .5584E-02
                                                                                                .4498E-02   .5593E-02
                                                                                                .2249E-01   .2797E-01
                                                                                                .1350E-01   .1678E-01
  .48    0.00     .56    0.00  0.00  1.073  0.00   .8311E-01    .74   1.48  0.0000   .6824E+00   .4491E-02   .5321E-02
                                                                                                .4499E-02   .5330E-02
                                                                                                .2249E-01   .2665E-01
                                                                                                .1350E-01   .1599E-01
  .52    0.00     .61    0.00  0.00  1.112  0.00   .7910E-01    .75   1.50  0.0000   .6495E+00   .4491E-02   .5065E-02
                                                                                                .4498E-02   .5073E-02
                                                                                                .2249E-01   .2537E-01
                                                                                                .1350E-01   .1522E-01
  .57    0.00     .66    0.00  0.00  1.142  0.00   .7524E-01    .76   1.53  0.0000   .6178E+00   .4491E-02   .4817E-02
                                                                                                .4499E-02   .4825E-02
                                                                                                .2249E-01   .2413E-01
```

EXAMPLE OUTPUT OF MODEL EXECUTION - LONG VERSION (9 of 61)

```
                                                                                         .1350E-01   .1449E-01
  .62   0.00    .72   0.00  0.00  1.164  0.00   .7134E-01   .78   1.55  0.0000   .5974E+00   .4491E-02   .4581E-02
                                                                                         .4498E-02   .4595E-02
                                                                                         .2249E-01   .2294E-01
                                                                                         .1350E-01   .1377E-01
  .67   0.00    .77   0.00  0.00  1.179  0.00   .6803E-01   .79   1.59  0.0000   .5586E+00   .4491E-02   .4355E-02
                                                                                         .4498E-02   .4363E-02
                                                                                         .2249E-01   .2182E-01
                                                                                         .1350E-01   .1309E-01
  .72   0.00    .83   0.00  0.00  1.190  0.00   .6471E-01   .80   1.61  0.0000   .5313E+00   .4491E-02   .4143E-02
                                                                                         .4498E-02   .4150E-02
                                                                                         .2249E-01   .2075E-01
                                                                                         .1350E-01   .1245E-01
  .76   0.00    .89   0.00  0.00  1.196  0.00   .6139E-01   .82   1.63  0.0000   .5056E+00   .4491E-02   .3943E-02
                                                                                         .4498E-02   .3949E-02
                                                                                         .2249E-01   .1973E-01
                                                                                         .1350E-01   .1185E-01
  .81   0.00    .94   0.00  0.00  1.198  0.00   .5864E-01   .83   1.66  0.0000   .4815E+00   .4491E-02   .3755E-02
                                                                                         .4498E-02   .3761E-02
                                                                                         .2249E-01   .1880E-01
                                                                                         .1350E-01   .1129E-01
  .86   0.00   1.00   0.00  0.00  1.198  0.00   .5585E-01   .84   1.69  0.0000   .4588E+00   .4491E-02   .3579E-02
                                                                                         .4498E-02   .3584E-02
                                                                                         .2249E-01   .1792E-01
                                                                                         .1350E-01   .1075E-01
  .91   0.00   1.06   0.00  0.00  1.195  0.00   .5338E-01   .85   1.71  0.0000   .4376E+00   .4491E-02   .3413E-02
                                                                                         .4498E-02   .3413E-02
                                                                                         .2249E-01   .1709E-01
                                                                                         .1350E-01   .1025E-01
  .95   0.00   1.11   0.00  0.00  1.190  0.00   .5088E-01   .87   1.74  0.0000   .4177E+00   .4491E-02   .3258E-02
                                                                                         .4498E-02   .3263E-02
                                                                                         .2249E-01   .1632E-01
                                                                                         .1350E-01   .9790E-02
 1.00   0.00   1.17   0.00  0.00  1.184  0.00   .4851E-01   .88   1.77  0.0000   .3991E+00   .4491E-02   .3113E-02
                                                                                         .4498E-02   .3117E-02
                                                                                         .2249E-01   .1559E-01
                                                                                         .1350E-01   .9354E-02
 1.05   0.00   1.23   0.00  0.00  1.177  0.00   .4643E-01   .90   1.79  0.0000   .3817E+00   .4491E-02   .2977E-02
                                                                                         .4498E-02   .2981E-02
                                                                                         .2249E-01   .1491E-01
                                                                                         .1350E-01   .8945E-02
 1.10   0.00   1.28   0.00  0.00  1.169  0.00   .4450E-01   .91   1.82  0.0000   .3654E+00   .4491E-02   .2850E-02
                                                                                         .4498E-02   .2854E-02
                                                                                         .2249E-01   .1427E-01
                                                                                         .1350E-01   .8564E-02
 1.14   0.00   1.34   0.00  0.00  1.160  0.00   .4264E-01   .92   1.85  0.0000   .3501E+00   .4491E-02   .2730E-02
                                                                                         .4498E-02   .2735E-02
                                                                                         .2249E-01   .1367E-01
                                                                                         .1350E-01   .8205E-02
 1.19   0.00   1.39   0.00  0.00  1.150  0.00   .4093E-01   .94   1.87  0.0000   .3358E+00   .4491E-02   .2619E-02
                                                                                         .4498E-02   .2623E-02
                                                                                         .2249E-01   .1311E-01
                                                                                         .1350E-01   .7870E-02
 1.24   0.00   1.45   0.00  0.00  1.140  0.00   .3926E-01   .95   1.90  0.0000   .3223E+00   .4491E-02   .2514E-02
                                                                                         .4498E-02   .2518E-02
                                                                                         .2249E-01   .1259E-01
                                                                                         .1350E-01   .7554E-02
 1.29   0.00   1.50   0.00  0.00  1.130  0.00   .3772E-01   .96   1.92  0.0000   .3097E+00   .4491E-02   .2415E-02
                                                                                         .4498E-02   .2419E-02
                                                                                         .2249E-01   .1210E-01
                                                                                         .1350E-01   .7259E-02
 1.34   0.00   1.56   0.00  0.00  1.120  0.00   .3627E-01   .97   1.95  0.0000   .2978E+00   .4491E-02   .2322E-02
                                                                                         .4498E-02   .2325E-02
                                                                                         .2249E-01   .1163E-01
                                                                                         .1350E-01   .6980E-02
 1.38   0.00   1.61   0.00  0.00  1.110  0.00   .3491E-01   .99   1.97  0.0000   .2866E+00   .4491E-02   .2233E-02
```

EXAMPLE OUTPUT OF MODEL EXECUTION - LONG VERSION (10 of 61)

```
                                                                                               .4498E-02   .2233E-02
                                                                                               .2249E-01   .1120E-01
                                                                                               .1350E-01   .5719E-02
1.43   0.00   1.66   0.00  0.00  1.099  0.00   .3353E-01   1.00   2.00  0.0000   .2761E+00   .4491E-02   .2153E-02
                                                                                               .4498E-02   .2157E-02
                                                                                               .2249E-01   .1079E-01
                                                                                               .1350E-01   .5471E-02
1.48   0.00   1.71   0.00  0.00  1.089  0.00   .3242E-01   1.01   2.02  0.0000   .2662E+00   .4491E-02   .2076E-02
                                                                                               .4499E-02   .2079E-02
                                                                                               .2249E-01   .1040E-01
                                                                                               .1350E-01   .6239E-02
1.53   0.00   1.77   0.00  0.00  1.079  0.00   .3128E-01   1.02   2.05  0.0000   .2568E+00   .4491E-02   .2003E-02
                                                                                               .4498E-02   .2005E-02
                                                                                               .2249E-01   .1003E-01
                                                                                               .1350E-01   .5013E-02
1.57   0.00   1.82   0.00  0.00  1.069  0.00   .3020E-01   1.04   2.07  0.0000   .2480E+00   .4491E-02   .1934E-02
                                                                                               .4498E-02   .1937E-02
                                                                                               .2249E-01   .9684E-02
                                                                                               .1350E-01   .5811E-02
1.62   0.00   1.87   0.00  0.00  1.059  0.00   .2919E-01   1.05   2.09  0.0000   .2396E+00   .4491E-02   .1869E-02
                                                                                               .4498E-02   .1871E-02
                                                                                               .2249E-01   .9357E-02
                                                                                               .1350E-01   .5613E-02
1.67   0.00   1.92   0.00  0.00  1.049  0.00   .2821E-01   1.06   2.12  0.0000   .2317E+00   .4491E-02   .1805E-02
                                                                                               .4498E-02   .1803E-02
                                                                                               .2249E-01   .9047E-02
                                                                                               .1350E-01   .5429E-02
1.72   0.00   1.97   0.00  0.00  1.039  0.00   .2730E-01   1.07   2.14  0.0000   .2241E+00   .4491E-02   .1749E-02
                                                                                               .4499E-02   .1751E-02
                                                                                               .2249E-01   .8754E-02
                                                                                               .1350E-01   .5253E-02
1.76   0.00   2.02   0.00  0.00  1.029  0.00   .2643E-01   1.08   2.16  0.0000   .2170E+00   .4491E-02   .1692E-02
                                                                                               .4499E-02   .1695E-02
                                                                                               .2249E-01   .8475E-02
                                                                                               .1350E-01   .5085E-02
1.81   0.00   2.07   0.00  0.00  1.020  0.00   .2561E-01   1.09   2.19  0.0000   .2103E+00   .4491E-02   .1640E-02
                                                                                               .4498E-02   .1642E-02
                                                                                               .2249E-01   .8212E-02
                                                                                               .1350E-01   .4929E-02
1.86   0.00   2.11   0.00  0.00  1.010  0.00   .2482E-01   1.10   2.21  0.0000   .2039E+00   .4491E-02   .1583E-02
                                                                                               .4498E-02   .1592E-02
                                                                                               .2249E-01   .7961E-02
                                                                                               .1350E-01   .4777E-02
1.91   0.00   2.16   0.00  0.00  1.001  0.00   .2408E-01   1.12   2.23  0.0000   .1977E+00   .4491E-02   .1542E-02
                                                                                               .4498E-02   .1544E-02
                                                                                               .2249E-01   .7722E-02
                                                                                               .1350E-01   .4634E-02
1.96   0.00   2.21   0.00  0.00   .992  0.00   .2337E-01   1.13   2.25  0.0000   .1919E+00   .4491E-02   .1495E-02
                                                                                               .4498E-02   .1493E-02
                                                                                               .2249E-01   .7494E-02
                                                                                               .1350E-01   .4497E-02
2.00   0.00   2.26   0.00  0.00   .983  0.00   .2270E-01   1.14   2.28  0.0000   .1863E+00   .4491E-02   .1453E-02
                                                                                               .4499E-02   .1455E-02
                                                                                               .2249E-01   .7273E-02
                                                                                               .1350E-01   .4367E-02
2.05   0.00   2.30   0.00  0.00   .975  0.00   .2205E-01   1.15   2.30  0.0000   .1811E+00   .4491E-02   .1412E-02
                                                                                               .4498E-02   .1414E-02
                                                                                               .2249E-01   .7071E-02
                                                                                               .1350E-01   .4243E-02
2.10   0.00   2.35   0.00  0.00   .966  0.00   .2144E-01   1.16   2.32  0.0000   .1760E+00   .4491E-02   .1373E-02
                                                                                               .4499E-02   .1375E-02
                                                                                               .2249E-01   .6874E-02
                                                                                               .1350E-01   .4125E-02
2.15   0.00   2.40   0.00  0.00   .958  0.00   .2085E-01   1.17   2.34  0.0000   .1712E+00   .4491E-02   .1335E-02
                                                                                               .4499E-02   .1337E-02
                                                                                               .2249E-01   .6645E-02
```

EXAMPLE OUTPUT OF MODEL EXECUTION - LONG VERSION (11 of 61)

```
                                                                                       .1350E-01   .4012E-02
2.19   0.00   2.44   0.00  0.00   .950  0.00   .2029E-01   1.18   2.36  0.0000   .1666E+00   .4491E-02   .1293E-02
                                                                                       .4498E-02   .1301E-02
                                                                                       .2249E-01   .5505E-02
                                                                                       .1350E-01   .3904E-02
2.24   0.00   2.49   0.00  0.00   .942  0.00   .1975E-01   1.19   2.38  0.0000   .1622E+00   .4491E-02   .1265E-02
                                                                                       .4498E-02   .1267E-02
                                                                                       .2249E-01   .6334E-02
                                                                                       .1350E-01   .3801E-02
2.29   0.00   2.53   0.00  0.00   .934  0.00   .1924E-01   1.20   2.41  0.0000   .1580E+00   .4491E-02   .1232E-02
                                                                                       .4498E-02   .1234E-02
                                                                                       .2249E-01   .5170E-02
                                                                                       .1350E-01   .3702E-02
2.34   0.00   2.58   0.00  0.00   .927  0.00   .1875E-01   1.21   2.43  0.0000   .1539E+00   .4491E-02   .1200E-02
                                                                                       .4498E-02   .1202E-02
                                                                                       .2249E-01   .5612E-02
                                                                                       .1350E-01   .3606E-02
2.39   0.00   2.62   0.00  0.00   .919  0.00   .1829E-01   1.22   2.45  0.0000   .1501E+00   .4491E-02   .1170E-02
                                                                                       .4498E-02   .1172E-02
                                                                                       .2249E-01   .5961E-02
                                                                                       .1350E-01   .3517E-02
2.43   0.00   2.66   0.00  0.00   .912  0.00   .1782E-01   1.23   2.47  0.0000   .1463E+00   .4491E-02   .1141E-02
                                                                                       .4498E-02   .1143E-02
                                                                                       .2249E-01   .5715E-02
                                                                                       .1350E-01   .3430E-02
2.48   0.00   2.71   0.00  0.00   .905  0.00   .1739E-01   1.24   2.49  0.0000   .1428E+00   .4491E-02   .1113E-02
                                                                                       .4498E-02   .1115E-02
                                                                                       .2249E-01   .5575E-02
                                                                                       .1350E-01   .3345E-02
2.53   0.00   2.75   0.00  0.00   .898  0.00   .1697E-01   1.25   2.51  0.0000   .1394E+00   .4491E-02   .1087E-02
                                                                                       .4498E-02   .1089E-02
                                                                                       .2249E-01   .5443E-02
                                                                                       .1350E-01   .3265E-02
2.58   0.00   2.79   0.00  0.00   .891  0.00   .1657E-01   1.26   2.53  0.0000   .1361E+00   .4491E-02   .1061E-02
                                                                                       .4498E-02   .1063E-02
                                                                                       .2249E-01   .5314E-02
                                                                                       .1350E-01   .3189E-02
2.62   0.00   2.83   0.00  0.00   .884  0.00   .1619E-01   1.27   2.55  0.0000   .1329E+00   .4491E-02   .1036E-02
                                                                                       .4498E-02   .1038E-02
                                                                                       .2249E-01   .5191E-02
                                                                                       .1350E-01   .3115E-02
2.67   0.00   2.88   0.00  0.00   .878  0.00   .1582E-01   1.28   2.57  0.0000   .1299E+00   .4491E-02   .1013E-02
                                                                                       .4498E-02   .1014E-02
                                                                                       .2249E-01   .5072E-02
                                                                                       .1350E-01   .3044E-02
2.72   0.00   2.92   0.00  0.00   .871  0.00   .1546E-01   1.29   2.59  0.0000   .1269E+00   .4491E-02   .9934E-03
                                                                                       .4498E-02   .9914E-03
                                                                                       .2249E-01   .4959E-02
                                                                                       .1350E-01   .2975E-02
2.77   0.00   2.96   0.00  0.00   .865  0.00   .1512E-01   1.30   2.61  0.0000   .1241E+00   .4491E-02   .9679E-03
                                                                                       .4498E-02   .9694E-03
                                                                                       .2249E-01   .4847E-02
                                                                                       .1350E-01   .2909E-02
2.81   0.00   3.00   0.00  0.00   .859  0.00   .1479E-01   1.31   2.63  0.0000   .1214E+00   .4491E-02   .9467E-03
                                                                                       .4498E-02   .9481E-03
                                                                                       .2249E-01   .4741E-02
                                                                                       .1350E-01   .2845E-02
2.86   0.00   3.04   0.00  0.00   .853  0.00   .1447E-01   1.32   2.65  0.0000   .1188E+00   .4491E-02   .9262E-03
                                                                                       .4498E-02   .9277E-03
                                                                                       .2249E-01   .4639E-02
                                                                                       .1350E-01   .2784E-02
2.91   0.00   3.08   0.00  0.00   .847  0.00   .1416E-01   1.33   2.66  0.0000   .1162E+00   .4491E-02   .9055E-03
                                                                                       .4498E-02   .9073E-03
                                                                                       .2249E-01   .4540E-02
                                                                                       .1350E-01   .2724E-02
2.96   0.00   3.12   0.00  0.00   .841  0.00   .1386E-01   1.34   2.69  0.0000   .1138E+00   .4491E-02   .8871E-03
```

EXAMPLE OUTPUT OF MODEL EXECUTION - LONG VERSION (12 of 61)

```
                                                                                                  .2249E-01   .4445E-02
                                                                                                  .1350E-01   .2667E-02
 3.01    0.00    3.16    0.00  0.00    .835  0.00    .1357E-01   1.35   2.70  0.0000   .1114E+00   .4491E-02   .3691E-03
                                                                                                  .4498E-02   .3704E-03
                                                                                                  .2249E-01   .4353E-02
                                                                                                  .1350E-01   .2612E-02
 3.05    0.00    3.20    0.00  0.00    .830  0.00    .1330E-01   1.36   2.72  0.0000   .1092E+00   .4491E-02   .3513E-03
                                                                                                  .4498E-02   .3527E-03
                                                                                                  .2249E-01   .4264E-02
                                                                                                  .1350E-01   .2559E-02
 3.10    0.00    3.24    0.00  0.00    .824  0.00    .1303E-01   1.37   2.74  0.0000   .1070E+00   .4491E-02   .3342E-03
                                                                                                  .4498E-02   .3355E-03
                                                                                                  .2249E-01   .4178E-02
                                                                                                  .1350E-01   .2507E-02
 3.15    0.00    3.28    0.00  0.00    .819  0.00    .1277E-01   1.38   2.76  0.0000   .1048E+00   .4491E-02   .3175E-03
                                                                                                  .4498E-02   .3188E-03
                                                                                                  .2249E-01   .4095E-02
                                                                                                  .1350E-01   .2457E-02
 3.20    0.00    3.32    0.00  0.00    .813  0.00    .1252E-01   1.39   2.78  0.0000   .1025E+00   .4491E-02   .3015E-03
                                                                                                  .4498E-02   .3028E-03
                                                                                                  .2249E-01   .4014E-02
                                                                                                  .1350E-01   .2409E-02
 3.24    0.00    3.36    0.00  0.00    .808  0.00    .1228E-01   1.40   2.79  0.0000   .1003E+00   .4491E-02   .2860E-03
                                                                                                  .4498E-02   .2872E-03
                                                                                                  .2249E-01   .3935E-02
                                                                                                  .1350E-01   .2362E-02
 3.29    0.00    3.40    0.00  0.00    .803  0.00    .1204E-01   1.41   2.81  0.0000   .9886E-01   .4491E-02   .2709E-03
                                                                                                  .4498E-02   .2721E-03
                                                                                                  .2249E-01   .3861E-02
                                                                                                  .1350E-01   .2317E-02
 3.34    0.00    3.44    0.00  0.00    .798  0.00    .1181E-01   1.42   2.83  0.0000   .9699E-01   .4491E-02   .2564E-03
                                                                                                  .4498E-02   .2575E-03
                                                                                                  .2249E-01   .3783E-02
                                                                                                  .1350E-01   .2273E-02
 3.39    0.00    3.47    0.00  0.00    .793  0.00    .1159E-01   1.42   2.85  0.0000   .9518E-01   .4491E-02   .2422E-03
                                                                                                  .4498E-02   .2434E-03
                                                                                                  .2249E-01   .3717E-02
                                                                                                  .1350E-01   .2231E-02
```

EXAMPLE OUTPUT OF MODEL EXECUTION - LONG VERSION (13 of 61)

```
PLOT OF CLOUD PATH AND RADIUS AS SEEN FROM POINT OF RELEASE

INDEPENDENT VARIABLE IS TIME (SEC) OVER RANGE     0.           3.4106

DEPENDENT VARIABLES, ALL NORMALIZED FOR PLOTTING ON UNIT AXIS

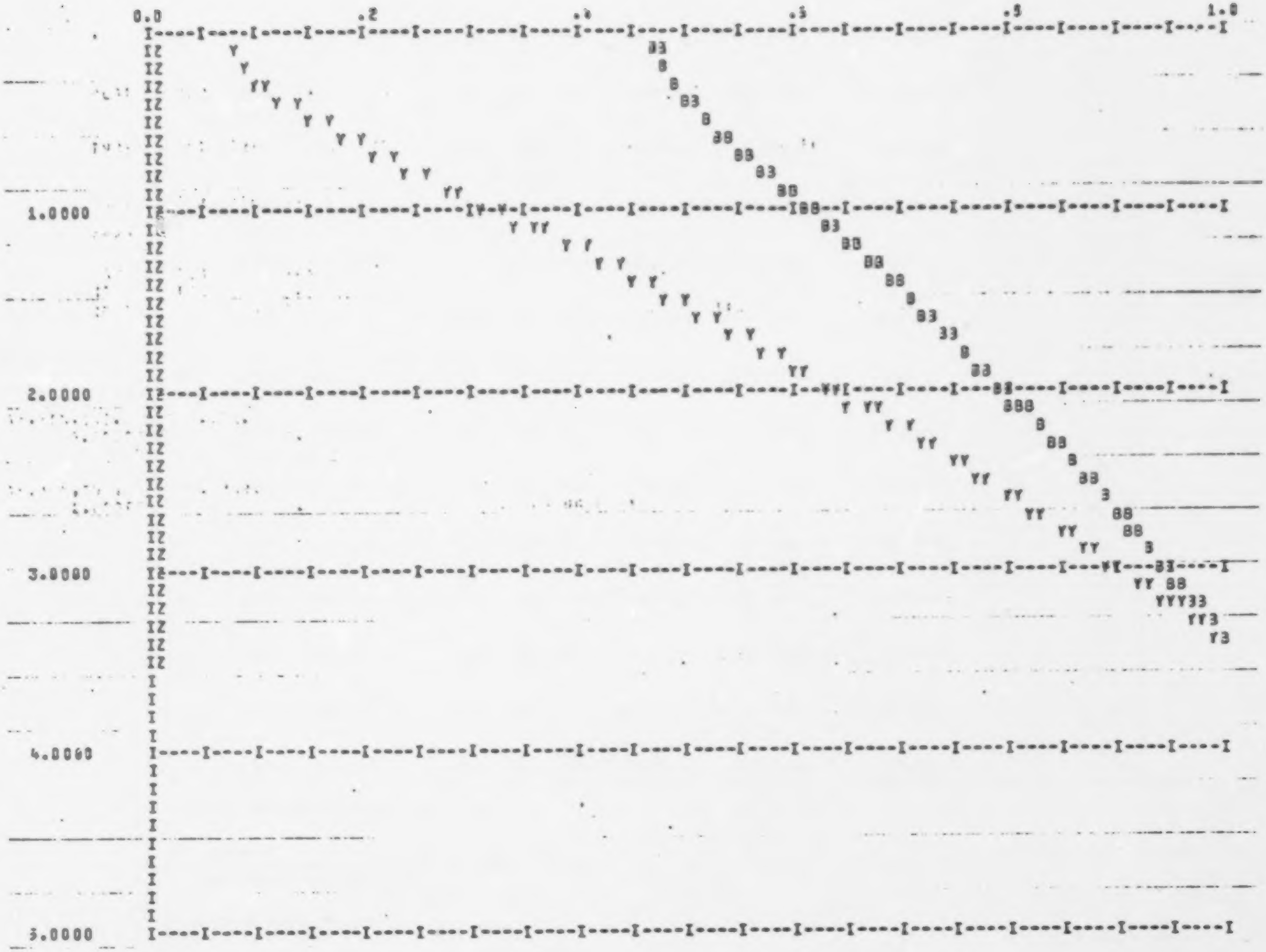
SYMBOL             Y                 B                  X                 Z

MAX PLOTTED     3.4732            1.4243              0.                0.
MIN PLOTTED     0.                0.                  0.                0.
REMARKS         DEPTH             RADIUS            HOR DIST(CX)      HOR DIST(CZ)


MAX,MIN,INC, OF IND.VAR.
      5.0000000       0.                  .10000000E+00

MAX,MIN,INC, OF DEP. VAR.
      1.0000000       0.                  .10000000E-01
```

EXAMPLE OUTPUT OF MODEL EXECUTION - LONG VERSION (14 of 61)



EXAMPLE OUTPUT OF MODEL EXECUTION - LONG VERSION (15 of 61)

```
   COLLAPSE PHASE OF CLOUD

   COMPUTATIONAL INDICATORS...
 NTRIAL   DT        IPLUNG  NUTRL  ISTEP  ISED   ILEAVE
   1    .2385E-01     1       3    517    143    999

   X AND Z MEASURED FROM BARGE POSITION

  TIME     X      Y     Z        U     V     W     DEN-DIF     AA    BC       FLUID CONC.  SOLID-VOL.   CONCENTRATION
  3.39    0.00   3.47  0.       0.00  .793  0.00  .1159E-01   1.42  2.849     .9318E-01   .4491E-02   .7422E-03
                                                                                          .4498E-02   .7434E-03
                                                                                          .2249E-01   .3717E-02
                                                                                          .1350E-01   .2231E-02
  3.53    0.00   3.56  0.       0.00  .527  0.00  .1157E-01   1.18  3.133     .9318E-01   .4461E-02   .7373E-03
                                                                                          .4480E-02   .7403E-03
                                                                                          .2244E-01   .3703E-02
                                                                                          .1350E-01   .2231E-02
  3.67    0.00   3.62  0.       0.00  .377  0.00  .1154E-01   1.01  3.387     .9319E-01   .4426E-02   .7315E-03
                                                                                          .4457E-02   .7367E-03
                                                                                          .2239E-01   .3700E-02
                                                                                          .1350E-01   .2230E-02
  3.82    0.00   3.67  0.       0.00  .283  0.00  .1150E-01    .88  3.618     .9319E-01   .4386E-02   .7243E-03
                                                                                          .4432E-02   .7325E-03
                                                                                          .2232E-01   .3683E-02
                                                                                          .1349E-01   .2230E-02
  3.96    0.00   3.70  0.       0.00  .221  0.00  .1146E-01    .79  3.831     .9319E-01   .4341E-02   .7175E-03
                                                                                          .4404E-02   .7273E-03
                                                                                          .2224E-01   .3676E-02
                                                                                          .1349E-01   .2230E-02
  4.10    0.00   3.73  0.       0.00  .177  0.00  .1142E-01    .71  4.028     .9319E-01   .4292E-02   .7093E-03
                                                                                          .4372E-02   .7225E-03
                                                                                          .2216E-01   .3662E-02
                                                                                          .1349E-01   .2230E-02
  4.25    0.00   3.76  0.       0.00  .145  0.00  .1137E-01    .65  4.213     .9320E-01   .4239E-02   .7004E-03
                                                                                          .4338E-02   .7170E-03
                                                                                          .2206E-01   .3647E-02
                                                                                          .1349E-01   .2229E-02
  4.39    0.00   3.77  0.       0.00  .121  0.00  .1132E-01    .58  4.387     .9320E-01   .4180E-02   .6903E-03
                                                                                          .4301E-02   .7103E-03
                                                                                          .2196E-01   .3630E-02
                                                                                          .1349E-01   .2229E-02
  4.53    0.00   3.79  0.       0.00  .102  0.00  .1127E-01    .56  4.551     .9320E-01   .4118E-02   .6807E-03
                                                                                          .4261E-02   .7043E-03
                                                                                          .2185E-01   .3613E-02
                                                                                          .1349E-01   .2229E-02
  4.67    0.00   3.80  0.       0.00  .085  0.00  .1121E-01    .52  4.705     .9321E-01   .4053E-02   .6703E-03
                                                                                          .4219E-02   .6974E-03
                                                                                          .2174E-01   .3594E-02
                                                                                          .1348E-01   .2229E-02
  4.82    0.00   3.82  0.       0.00  .076  0.00  .1115E-01    .49  4.852     .9321E-01   .3985E-02   .6589E-03
                                                                                          .4174E-02   .6901E-03
                                                                                          .2162E-01   .3573E-02
                                                                                          .1348E-01   .2229E-02
  4.96    0.00   3.83  0.       0.00  .064  0.00  .1109E-01    .46  4.991     .9321E-01   .3914E-02   .6470E-03
                                                                                          .4128E-02   .6824E-03
                                                                                          .2149E-01   .3552E-02
                                                                                          .1347E-01   .2229E-02
  5.10    0.00   3.83  0.       0.00  .058  0.00  .1102E-01    .44  5.123     .9322E-01   .3840E-02   .6349E-03
                                                                                          .4079E-02   .6743E-03
                                                                                          .2135E-01   .3530E-02
                                                                                          .1347E-01   .2227E-02
  5.25    0.00   3.84  0.       0.00  .051  0.00  .1095E-01    .42  5.249     .9322E-01   .3764E-02   .6223E-03
                                                                                          .4028E-02   .6660E-03
```

EXAMPLE OUTPUT OF MODEL EXECUTION - LONG VERSION (16 of 61)

```
                                                                                             .2121E-01    .3507E-02
                                                                                             .1347E-01    .2227E-02
  5.39    0.00    3.85  0.        0.00  .046  0.00  .1088E-01   .40  5.363        .9523E-01  .3686E-02    .5094E-03
                                                                                             .3976E-02    .5573E-03
                                                                                             .2105E-01    .3483E-02
                                                                                             .1346E-01    .2225E-02
  5.53    0.00    3.86  0.        0.00  .041  0.00  .1080E-01   .38  5.482        .9523E-01  .3606E-02    .5963E-03
                                                                                             .3922E-02    .6484E-03
                                                                                             .2091E-01    .3459E-02
                                                                                             .1346E-01    .2225E-02
  5.68    0.00    3.86  0.        0.00  .037  0.00  .1073E-01   .37  5.598        .9524E-01  .3525E-02    .5823E-03
                                                                                             .3866E-02    .6393E-03
                                                                                             .2075E-01    .3432E-02
                                                                                             .1346E-01    .2225E-02
  5.82    0.00    3.87  0.        0.00  .033  0.00  .1065E-01   .36  5.693        .9524E-01  .3443E-02    .5693E-03
                                                                                             .3809E-02    .6300E-03
                                                                                             .2059E-01    .3405E-02
                                                                                             .1345E-01    .2225E-02
  5.95    0.00    3.87  0.        0.00  .030  0.00  .1057E-01   .34  5.791        .9525E-01  .3359E-02    .5555E-03
                                                                                             .3752E-02    .6204E-03
                                                                                             .2042E-01    .3377E-02
                                                                                             .1345E-01    .2224E-02
  6.11    0.00    3.87  0.        0.00  .027  0.00  .1049E-01   .33  5.883        .9525E-01  .3275E-02    .5416E-03
                                                                                             .3693E-02    .6107E-03
                                                                                             .2025E-01    .3349E-02
                                                                                             .1344E-01    .2223E-02
  6.25    0.00    3.88  0.        0.00  .024  0.00  .1040E-01   .32  5.971        .9526E-01  .3191E-02    .5277E-03
                                                                                             .3633E-02    .6009E-03
                                                                                             .2008E-01    .3320E-02
                                                                                             .1344E-01    .2223E-02
  6.39    0.00    3.88  0.        0.00  .022  0.00  .1032E-01   .31  6.055        .9526E-01  .3106E-02    .5137E-03
                                                                                             .3572E-02    .5909E-03
                                                                                             .1990E-01    .3291E-02
                                                                                             .1344E-01    .2222E-02
  6.53    0.00    3.89  0.        0.00  .020  0.00  .1023E-01   .31  6.134        .9527E-01  .3021E-02    .4999E-03
                                                                                             .3511E-02    .5809E-03
                                                                                             .1972E-01    .3261E-02
                                                                                             .1343E-01    .2222E-02
  6.65    0.00    3.89  0.        0.00  .019  0.00  .1015E-01   .30  6.209        .9527E-01  .2937E-02    .4859E-03
                                                                                             .3450E-02    .5705E-03
                                                                                             .1953E-01    .3231E-02
                                                                                             .1343E-01    .2221E-02
  6.82    0.00    3.89  0.        0.00  .017  0.00  .1006E-01   .29  6.279        .9528E-01  .2853E-02    .4720E-03
                                                                                             .3388E-02    .5604E-03
                                                                                             .1934E-01    .3200E-02
                                                                                             .1342E-01    .2220E-02
  6.95    0.00    3.89  0.        0.00  .015  0.00  .9975E-02   .29  6.345        .9528E-01  .2770E-02    .4582E-03
                                                                                             .3325E-02    .5501E-03
                                                                                             .1915E-01    .3169E-02
                                                                                             .1342E-01    .2220E-02
  7.11    0.00    3.89  0.        0.00  .014  0.00  .9887E-02   .28  6.409        .9529E-01  .2687E-02    .4445E-03
                                                                                             .3263E-02    .5399E-03
                                                                                             .1896E-01    .3137E-02
                                                                                             .1341E-01    .2219E-02
  7.25    0.00    3.90  0.        0.00  .013  0.00  .9799E-02   .28  6.469        .9529E-01  .2606E-02    .4311E-03
                                                                                             .3201E-02    .5295E-03
                                                                                             .1877E-01    .3105E-02
                                                                                             .1341E-01    .2219E-02
  7.39    0.00    3.90  0.        0.00  .012  0.00  .9711E-02   .27  6.525        .9530E-01  .2525E-02    .4173E-03
                                                                                             .3139E-02    .5193E-03
                                                                                             .1857E-01    .3073E-02
                                                                                             .1340E-01    .2217E-02
  7.54    0.00    3.90  0.        0.00  .011  0.00  .9623E-02   .27  6.578        .9530E-01  .2446E-02    .4047E-03
                                                                                             .3077E-02    .5091E-03
                                                                                             .1839E-01    .3041E-02
                                                                                             .1340E-01    .2217E-02
```

EXAMPLE OUTPUT OF MODEL EXECUTION - LONG VERSION (17 of 61)

```
                                                                                        .1340E-01   .2217E-02
 7.68   0.00   3.90  0.      0.00  .010  0.00  .9536E-02  .26  6.627   .9531E-01   .2368E-02   .3915E-03
                                                                                        .3015E-02   .4989E-03
                                                                                        .1818E-01   .3009E-02
                                                                                        .1339E-01   .2215E-02
 7.82   0.00   3.90  0.      0.00  .009  0.00  .9448E-02  .26  6.676   .9531E-01   .2291E-02   .3791E-03
                                                                                        .2953E-02   .4889E-03
                                                                                        .1798E-01   .2975E-02
                                                                                        .1338E-01   .2213E-02
 7.97   0.00   3.90  0.      0.00  .009  0.00  .9361E-02  .26  6.718   .9532E-01   .2216E-02   .3667E-03
                                                                                        .2893E-02   .4787E-03
                                                                                        .1779E-01   .2943E-02
                                                                                        .1338E-01   .2214E-02
 8.11   0.00   3.91  0.      0.00  .008  0.00  .9274E-02  .25  6.759   .9532E-01   .2142E-02   .3545E-03
                                                                                        .2832E-02   .4687E-03
                                                                                        .1759E-01   .2911E-02
                                                                                        .1337E-01   .2213E-02
 8.25   0.00   3.91  0.      0.00  .007  0.00  .9188E-02  .25  6.797   .9533E-01   .2070E-02   .3427E-03
                                                                                        .2772E-02   .4593E-03
                                                                                        .1739E-01   .2879E-02
                                                                                        .1337E-01   .2213E-02
 8.40   0.00   3.91  0.      0.00  .007  0.00  .9102E-02  .25  6.833   .9534E-01   .2000E-02   .3310E-03
                                                                                        .2713E-02   .4491E-03
                                                                                        .1719E-01   .2845E-02
                                                                                        .1336E-01   .2212E-02
 8.54   0.00   3.91  0.      0.00  .006  0.00  .9017E-02  .24  6.867   .9534E-01   .1931E-02   .3197E-03
                                                                                        .2654E-02   .4394E-03
                                                                                        .1699E-01   .2812E-02
                                                                                        .1336E-01   .2211E-02
 8.68   0.00   3.91  0.      0.00  .006  0.00  .8932E-02  .24  6.898   .9535E-01   .1864E-02   .3085E-03
                                                                                        .2597E-02   .4293E-03
                                                                                        .1679E-01   .2783E-02
                                                                                        .1335E-01   .2210E-02
 8.82   0.00   3.91  0.      0.00  .005  0.00  .8849E-02  .24  6.929   .9535E-01   .1799E-02   .2979E-03
                                                                                        .2539E-02   .4204E-03
                                                                                        .1659E-01   .2747E-02
                                                                                        .1334E-01   .2209E-02
 8.97   0.00   3.91  0.      0.00  .005  0.00  .8766E-02  .24  6.955   .9536E-01   .1736E-02   .2874E-03
                                                                                        .2483E-02   .4111E-03
                                                                                        .1640E-01   .2715E-02
                                                                                        .1334E-01   .2209E-02
 9.11   0.00   3.91  0.      0.00  .004  0.00  .8684E-02  .24  6.981   .9536E-01   .1674E-02   .2772E-03
                                                                                        .2428E-02   .4026E-03
                                                                                        .1620E-01   .2683E-02
                                                                                        .1333E-01   .2207E-02
 9.25   0.00   3.91  0.      0.00  .004  0.00  .8603E-02  .24  7.005   .9537E-01   .1614E-02   .2673E-03
                                                                                        .2373E-02   .3923E-03
                                                                                        .1601E-01   .2650E-02
                                                                                        .1333E-01   .2207E-02
 9.40   0.00   3.91  0.      0.00  .004  0.00  .8523E-02  .23  7.027   .9537E-01   .1556E-02   .2577E-03
                                                                                        .2319E-02   .3841E-03
                                                                                        .1581E-01   .2613E-02
                                                                                        .1332E-01   .2205E-02
 9.54   0.00   3.91  0.      0.00  .004  0.00  .8444E-02  .23  7.047   .9538E-01   .1500E-02   .2484E-03
                                                                                        .2267E-02   .3753E-03
                                                                                        .1562E-01   .2587E-02
                                                                                        .1331E-01   .2205E-02
 9.68   0.00   3.91  0.      0.00  .003  0.00  .8366E-02  .23  7.066   .9538E-01   .1445E-02   .2394E-03
                                                                                        .2215E-02   .3669E-03
                                                                                        .1543E-01   .2555E-02
                                                                                        .1331E-01   .2204E-02
 9.83   0.00   3.91  0.      0.00  .003  0.00  .8288E-02  .23  7.084   .9539E-01   .1392E-02   .2305E-03
                                                                                        .2164E-02   .3583E-03
                                                                                        .1524E-01   .2524E-02
                                                                                        .1330E-01   .2203E-02
 9.97   0.00   3.91  0.      0.00  .003  0.00  .8212E-02  .23  7.101   .9539E-01   .1341E-02   .2221E-03
```

EXAMPLE OUTPUT OF MODEL EXECUTION - LONG VERSION (18 of 61)

```
                                                                                      .1505E-01  .2493E-02
                                                                                      .1330E-01  .2202E-02
 10.11   0.00   3.91  0.      0.00  .003  0.00  .8137E-02   .23  7.116    .9539E-01   .1292E-02  .2140E-03
                                                                                      .2664E-02  .3413E-03
                                                                                      .1456E-01  .2462E-02
                                                                                      .1329E-01  .2231E-02
 10.26   0.00   3.91  0.      0.00  .002  0.00  .8063E-02   .23  7.130    .9540E-01   .1244E-02  .2060E-03
                                                                                      .2015E-02  .3340E-03
                                                                                      .1468E-01  .2431E-02
                                                                                      .1329E-01  .2203E-02
 10.40   0.00   3.92  0.      0.00  .002  0.00  .7990E-02   .23  7.144    .9540E-01   .1198E-02  .1984E-03
                                                                                      .1969E-02  .3262E-03
                                                                                      .1449E-01  .2401E-02
                                                                                      .1328E-01  .2193E-02
 10.54   0.00   3.92  0.      0.00  .002  0.00  .7918E-02   .23  7.156    .9541E-01   .1153E-02  .1910E-03
                                                                                      .1923E-02  .3195E-03
                                                                                      .1431E-01  .2371E-02
                                                                                      .1327E-01  .2193E-02
 10.69   0.00   3.92  0.      0.00  .002  0.00  .7843E-02   .22  7.167    .9541E-01   .1110E-02  .1835E-03
                                                                                      .1877E-02  .3110E-03
                                                                                      .1413E-01  .2341E-02
                                                                                      .1326E-01  .2197E-02
 10.83   0.00   3.92  0.      0.00  .002  0.00  .7778E-02   .22  7.178    .9542E-01   .1068E-02  .1769E-03
                                                                                      .1833E-02  .3037E-03
                                                                                      .1395E-01  .2311E-02
                                                                                      .1326E-01  .2195E-02
 10.97   0.00   3.92  0.      0.00  .002  0.00  .7709E-02   .22  7.187    .9542E-01   .1028E-02  .1703E-03
                                                                                      .1789E-02  .2965E-03
                                                                                      .1377E-01  .2282E-02
                                                                                      .1325E-01  .2195E-02
 11.11   0.00   3.92  0.      0.00  .001  0.00  .7641E-02   .22  7.196    .9543E-01   .9888E-03  .1633E-03
                                                                                      .1747E-02  .2894E-03
                                                                                      .1360E-01  .2253E-02
                                                                                      .1324E-01  .2194E-02
 11.26   0.00   3.92  0.      0.00  .001  0.00  .7575E-02   .22  7.205    .9543E-01   .9513E-03  .1575E-03
                                                                                      .1705E-02  .2825E-03
                                                                                      .1343E-01  .2225E-02
                                                                                      .1324E-01  .2194E-02
 11.40   0.00   3.92  0.      0.00  .001  0.00  .7509E-02   .22  7.212    .9543E-01   .9152E-03  .1517E-03
                                                                                      .1664E-02  .2759E-03
                                                                                      .1325E-01  .2195E-02
                                                                                      .1323E-01  .2193E-02
 11.54   0.00   3.92  0.      0.00  .001  0.00  .7445E-02   .22  7.219    .9544E-01   .8804E-03  .1459E-03
                                                                                      .1625E-02  .2692E-03
                                                                                      .1308E-01  .2165E-02
                                                                                      .1323E-01  .2192E-02
 11.69   0.00   3.92  0.      0.00  .001  0.00  .7381E-02   .22  7.226    .9544E-01   .8469E-03  .1403E-03
                                                                                      .1586E-02  .2629E-03
                                                                                      .1292E-01  .2140E-02
                                                                                      .1322E-01  .2191E-02
 11.83   0.00   3.92  0.      0.00  .001  0.00  .7319E-02   .22  7.232    .9544E-01   .8145E-03  .1350E-03
                                                                                      .1547E-02  .2565E-03
                                                                                      .1275E-01  .2113E-02
                                                                                      .1321E-01  .2190E-02
 11.97   0.00   3.92  0.      0.00  .001  0.00  .7257E-02   .22  7.237    .9545E-01   .7834E-03  .1299E-03
                                                                                      .1510E-02  .2503E-03
                                                                                      .1259E-01  .2085E-02
                                                                                      .1321E-01  .2189E-02
 12.12   0.00   3.92  0.      0.00  .001  0.00  .7197E-02   .22  7.242    .9545E-01   .7534E-03  .1249E-03
                                                                                      .1474E-02  .2443E-03
                                                                                       1242E-01  .2059E-02
                                                                                      .1320E-01  .2189E-02
 12.26   0.00   3.92  0.      0.00  .001  0.00  .7137E-02   .22  7.247    .9546E-01   .7245E-03  .1201E-03
                                                                                      .1438E-02  .2384E-03
                                                                                      .1226E-01  .2033E-02
                                                                                      .1319E-01  .2187E-02
```

EXAMPLE OUTPUT OF MODEL EXECUTION - LONG VERSION (19 of 61)

```
PLOT OF COLLAPSING CLOUD CHARACTERISTICS

    INDEPENDENT VARIABLE IS TIME OVER RANGE     0.          12.330

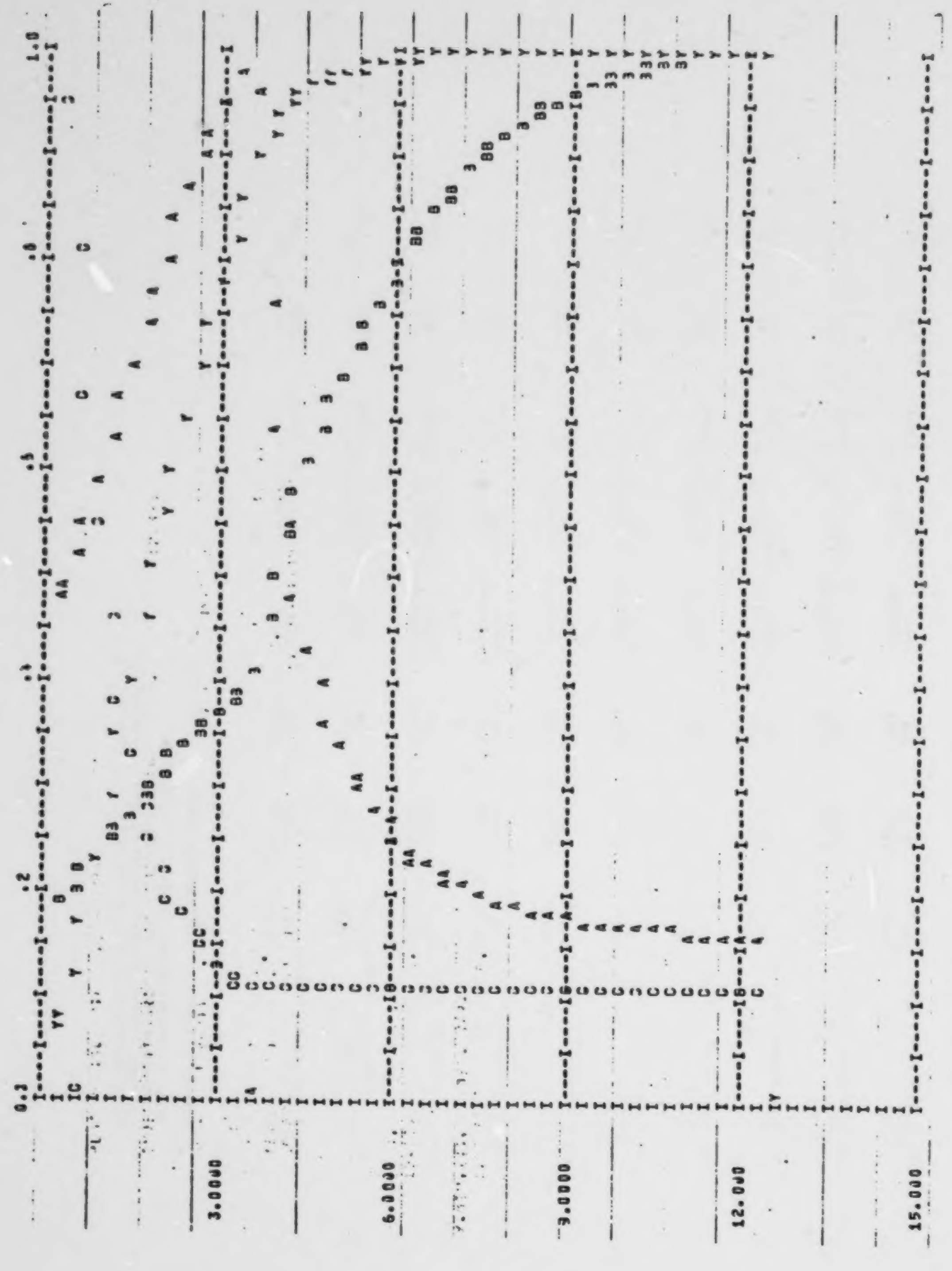
    DEPENDENT VARIABLE, ALL NORMALIZED FOR PLOTTING ON UNIT AXIS

    SYMBOL            A               B             C              Y
    MAX PLOTTED     1.8973          7.2455        .92754         3.9177
    MIN PLOTTED     0.              0.            0.             0.
    REMARKS        VERT SIZE       HOR SIZE     CONCENTRATION   DEPTH


MAX,MIN,INC, OF IND.VAR.
     15.000000            0.                    .30000000

MAX,MIN,INC, OF DEP. VAR.
     1.0000000            0.                    .10000000E-01
```

EXAMPLE OUTPUT OF MODEL EXECUTION - LONG VERSION (20 of 61)



EXAMPLE OUTPUT OF MODEL EXECUTION - LONG VERSION (21 of 61)

```
        BEGIN LONG TERM SIMULATION OF FATE OF 100-90

 NEW CLOUD CREATED, NTCLD =    1
   T(SEC)       TX          TZ          TSIDE       TOP        TTHK        TMASS       TEMAS          NEXT      LAST
    1.216      30.00       30.00        1.673      1.774      .4865E-01   .8044E-05   0.              52         1

 NEW CLOUD CREATED, NTCLD =    2
   T(SEC)       TX          TZ          TSIDE       TOP        TTHK        TMASS       TEMAS          NEXT      LAST
    3.649      30.00       30.00        2.965      3.903      .9731E-01   .5875E-04   0.             154        52

 NEW CLOUD CREATED, NTCLD =    2
   T(SEC)       TX          TZ          TSIDE       TOP        TTHK        TMASS       TEMAS          NEXT      LAST
    4.865      30.00       30.00        4.342      3.951      .4865E-01   .4710E-03   0.             203       103

 NEW CLOUD CREATED, NTCLD =    2
   T(SEC)       TX          TZ          TSIDE       TOP        TTHK        TMASS       TEMAS          NEXT      LAST
    6.082      30.00       30.00        5.201      3.951      .4865E-01   .6724E-03   0.             255       205

 NEW CLOUD CREATED, NTCLD =    2
   T(SEC)       TX          TZ          TSIDE       TOP        TTHK        TMASS       TEMAS          NEXT      LAST
    7.298      30.00       30.00        5.758      3.951      .4865E-01   .7135E-03   0.             307       256

 NEW CLOUD CREATED, NTCLD =    2
   T(SEC)       TX          TZ          TSIDE       TOP        TTHK        TMASS       TEMAS          NEXT      LAST
    8.514      30.00       30.00        6.031      3.951      .4865E-01   .6361E-03   0.             353       307

 NEW CLOUD CREATED, NTCLD =    2
   T(SEC)       TX          TZ          TSIDE       TOP        TTHK        TMASS       TEMAS          NEXT      LAST
    9.731      30.00       30.00        6.265      3.951      .4865E-01   .5150E-03   0.             409       358

 NEW CLOUD CREATED, NTCLD =    2
   T(SEC)       TX          TZ          TSIDE       TOP        TTHK        TMASS       TEMAS          NEXT      LAST
    10.95      30.00       30.00        6.365      3.951      .4865E-01   .3933E-03   0.             460       409

 NEW CLOUD CREATED, NTCLD =    2
   T(SEC)       TX          TZ          TSIDE       TOP        TTHK        TMASS       TEMAS          NEXT      LAST
    12.16      30.00       30.00        6.428      3.951      .4865E-01   .2905E-03   0.             511       460

 NEW CLOUD CREATED, NTCLD =    2
   T(SEC)       TX          TZ          TSIDE       TOP        TTHK        TMASS       TEMAS          NEXT      LAST
    12.31      30.00       30.00        6.424      3.773      .2250       .7435E-03   0.             517       511


      SUMMARY OF 100-90     DISTRIBUTIONS AFTER      15.00 SEC.

      TOTAL SUSPENDED MATERIAL (CUFT) =     .39567E-03
      SUSPENDED MATERIAL IN LONG TERM GRID (CUFT) =     0.
      SUSPENDED MATERIAL IN SMALL CLOUDS (CUFT) =     .39567E-03
      TOTAL MATERIAL SETTLED TO BOTTOM (CUFT) =     .41035E-02
```

EXAMPLE OUTPUT OF MODEL EXECUTION - LONG VERSION (22 of 61)

```
OUTPUT SUPPRESSED IN LOCATIONS WITH NO MATERIAL PRESENT


SUMMARY OF 100-90     DISTRIBUTIONS AFTER      30.00 SEC.

 TOTAL SUSPENDED MATERIAL (CUFT) =      .80438E-05
 SUSPENDED MATERIAL IN LONG TERM GRID (CUFT) =      0.
 SUSPENDED MATERIAL IN SMALL CLOUDS (CUFT) =      .80438E-05
 TOTAL MATERIAL SETTLED TO BOTTOM (CUFT) =      .44912E-02

OUTPUT SUPPRESSED IN LOCATIONS WITH NO MATERIAL PRESENT


SUMMARY OF 100-90     DISTRIBUTIONS AFTER      45.00 SEC.

TOTAL SUSPENDED MATERIAL (CUFT) =      .80438E-05
SUSPENDED MATERIAL IN LONG TERM GRID (CUFT) =      .80438E-05
SUSPENDED MATERIAL IN SMALL CLOUDS (CUFT) =      0.
TOTAL MATERIAL SETTLED TO BOTTOM (CUFT) =      .44912E-02

OUTPUT SUPPRESSED IN LOCATIONS WITH NO MATERIAL PRESENT


SUMMARY OF 100-90     DISTRIBUTIONS AFTER      60.00 SEC.

TOTAL SUSPENDED MATERIAL (CUFT) =      0.
SUSPENDED MATERIAL IN LONG TERM GRID (CUFT) =      0.
SUSPENDED MATERIAL IN SMALL CLOUDS (CUFT) =      0.
TOTAL MATERIAL SETTLED TO BOTTOM (CUFT) =      .44993E-02

OUTPUT SUPPRESSED IN LOCATIONS WITH NO MATERIAL PRESENT


COMPUTATIONS FOR 100-90     TERMINATED AT      60.00  SEC. ELAPSED TIME...MATERIAL SETTLED TO BOTTOM
```

EXAMPLE OUTPUT OF MODEL EXECUTION - LONG VERSION (23 of 61)

```
BOTTOM ACCUMULATION OF 180-90      (CUFT/GRID SQUARE)       60.00 SECONDS AFTER JUMP
...MULTIPLY DISPLAYED VALUES BY    .1000E-03      (LEGEND... + = .LT. .01    . = .LT. .0001    0 = .LT. .000001)
 M N=  1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16  17  18  19  20  21  22  23  24  25  26  27  28  29  30  31

  1 00000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000
  2 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
  3 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
  4 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
  5 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
  6 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
  7 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
  8 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
  9 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
 10 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
 11 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
 12 0000   0   0   0   0   0   0   0   0   0   0   0   +   +   +   +   +   0   0   0   0   0   0   0   0   0   0   0   0  00000
 13 0000   0   0   0   0   0   0   0   0   0   0   + 1.0 1.0 1.0 1.0 1.0   +   0   0   0   0   0   0   0   0   0   0   0  00000
 14 0000   0   0   0   0   0   0   0   0   0   0   + 1.0 3.1 3.1 3.1 1.0   +   0   0   0   0   0   0   0   0   0   0   0  00000
 15 0000   0   0   0   0   0   0   0   0   0   0   + 1.0 3.1 3.2 3.1 1.0   +   0   0   0   0   0   0   0   0   0   0   0  00000
 16 0000   0   0   0   0   0   0   0   0   0   0   + 1.0 3.1 3.1 3.1 1.0   +   0   0   0   0   0   0   0   0   0   0   0  00000
 17 0000   0   0   0   0   0   0   0   0   0   0   + 1.0 1.0 1.0 1.0 1.0   +   0   0   0   0   0   0   0   0   0   0   0  00000
 18 0000   0   0   0   0   0   0   0   0   0   0   0   +   +   +   +   +   0   0   0   0   0   0   0   0   0   0   0   0  00000
 19 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
 20 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
 21 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
 22 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
 23 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
 24 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
 25 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
 26 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
 27 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
 28 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
 29 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
 30 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
```

EXAMPLE OUTPUT OF MODEL EXECUTION - LONG VERSION (24 of 61)

```
THICKNESS (FT) OF 180-93     ACCUMULATED ON BOTTOM,      60.00 SECONDS AFTER DUMP
...MULTIPLY DISPLAYED VALUES BY   .1000E-03      (LEGEND... + = .LT. .01    . = .LT. .0001   0 = .LT. .00001)
 N M=  1  2  3  4  5  6  7  8  9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
  1 000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000
  2 0000  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  00000
  3 0000  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  00000
  4 0000  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  00000
  5 0000  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  00000
  6 0000  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  00000
  7 0000  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  00000
  8 0000  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  00000
  9 0000  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  00000
 10 0000  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  00000
 11 0000  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  00000
 12 0000  0  0  0  0  0  0  0  0  0  0  0  +  +  +  +  +  0  0  0  0  0  0  0  0  0  0  0  0  00000
 13 0000  0  0  0  0  0  0  0  0  0  0  + .45 .45 .45 .45 .45 +  0  0  0  0  0  0  0  0  0  0  0  00000
 14 0000  0  0  0  0  0  0  0  0  0  0  + .45 1.4 1.4 1.4 .45 +  0  0  0  0  0  0  0  0  0  0  0  00000
 15 0000  0  0  0  0  0  0  0  0  0  0  + .45 1.4 1.4 1.4 .45 +  0  0  0  0  0  0  0  0  0  0  0  00000
 16 0000  0  0  0  0  0  0  0  0  0  0  + .45 1.4 1.4 1.4 .45 +  0  0  0  0  0  0  0  0  0  0  0  00000
 17 0000  0  0  0  0  0  0  0  0  0  0  + .45 .45 .45 .45 .45 +  0  0  0  0  0  0  0  0  0  0  0  00000
 18 0000  0  0  0  0  0  0  0  0  0  0  0  +  +  +  +  +  0  0  0  0  0  0  0  0  0  0  0  0  00000
 19 0000  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  00000
 20 0000  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  00000
 21 0000  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  00000
 22 0000  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  00000
 23 0000  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  00000
 24 0000  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  00000
 25 0000  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  00000
 26 0000  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  00000
 27 0000  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  00000
 28 0000  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  00000
 29 0000  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  00000
 30 0000  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  00000
```

EXAMPLE OUTPUT OF MODEL EXECUTION - LONG VERSION (25 of 61)

```
        BEGIN LONG TERM SIMULATION OF FATE OF 90-80

 NEW CLOUD CREATED, NTCLD =     1
   T(SEC)        TX          TZ          TSIDE        TOP         TTHK          TMASS        TEMAS          NEXT        LAST
   3.649        30.00       30.00        2.353        3.903       .9123E-01     .3795E-04    0.             154          1

 NEW CLOUD CREATED, NTCLD =     1
   T(SEC)        TX          TZ          TSIDE        TOP         TTHK          TMASS        TEMAS          NEXT        LAST
   4.865        30.00       30.00        4.342        3.973       .3041E-01     .3023E-03    0.             205         154

 NEW CLOUD CREATED, NTCLD =     1
   T(SEC)        TX          TZ          TSIDE        TOP         TTHK          TMASS        TEMAS          NEXT        LAST
   6.082        30.00       30.00        5.201        3.970       .3041E-01     .4564E-03    0.             256         205

 NEW CLOUD CREATED, NTCLD =     1
   T(SEC)        TX          TZ          TSIDE        TOP         TTHK          TMASS        TEMAS          NEXT        LAST
   7.298        30.00       30.00        5.753        3.973       .3041E-01     .5225E-03    0.             307         256

 NEW CLOUD CREATED, NTCLD =     1
   T(SEC)        TX          TZ          TSIDE        TOP         TTHK          TMASS        TEMAS          NEXT        LAST
   8.514        30.00       30.00        6.031        3.973       .3041E-01     .5153E-03    0.             358         307

 NEW CLOUD CREATED, NTCLD =     1
   T(SEC)        TX          TZ          TSIDE        TOP         TTHK          TMASS        TEMAS          NEXT        LAST
   9.731        30.00       30.00        6.258        3.973       .3041E-01     .4665E-03    0.             409         358

 NEW CLOUD CREATED, NTCLD =     1
   T(SEC)        TX          TZ          TSIDE        TOP         TTHK          TMASS        TEMAS          NEXT        LAST
   10.95        30.00       30.00        6.353        3.970       .3041E-01     .4003E-03    0.             460         409

 NEW CLOUD CREATED, NTCLD =     1
   T(SEC)        TX          TZ          TSIDE        TOP         TTHK          TMASS        TEMAS          NEXT        LAST
   12.16        30.00       30.00        6.420        3.973       .3041E-01     .3349E-03    0.             511         460

 NEW CLOUD CREATED, NTCLD =     1
   T(SEC)        TX          TZ          TSIDE        TOP         TTHK          TMASS        TEMAS          NEXT        LAST
   12.31        30.00       30.00        6.424        3.777       .2229         .1452E-02    0.             517         511


   SUMMARY OF 90-80       DISTRIBUTIONS AFTER      15.03 SEC.

   TOTAL SUSPENDED MATERIAL (CUFT) =      .10203E-02
   SUSPENDED MATERIAL IN LONG TERM GRID (CUFT) =      0.
   SUSPENDED MATERIAL IN SMALL CLOUDS (CUFT) =      .10203E-02
   TOTAL MATERIAL SETTLED TO BOTTOM (CUFT) =      .34798E-02

   OUTPUT SUPPRESSED IN LOCATIONS WITH NO MATERIAL PRESENT
```

EXAMPLE OUTPUT OF MODEL EXECUTION - LONG VERSION (26 of 61)

```
SUMMARY OF 30-80      DISTRIBUTIONS AFTER      30.00 SEC.

TOTAL SUSPENDED MATERIAL (CUFT) =      0.
SUSPENDED MATERIAL IN LONG TERM GRID (CUFT) =      0.
SUSPENDED MATERIAL IN SMALL CLOUDS (CUFT) =      0.
TOTAL MATERIAL SETTLED TO BOTTOM (CUFT) =      .44993E-02

OUTPUT SUPPRESSED IN LOCATIONS WITH NO MATERIAL PRESENT


COMPUTATIONS FOR 30-80      TERMINATED AT      30.00  SEC. ELAPSED TIME...MATERIAL SETTLED TO BOTTOM
```

EXAMPLE OUTPUT OF MODEL EXECUTION - LONG VERSION (27 of 61)

```
BOTTOM ACCUMULATION OF 90-80      (CUFT/GRID SQUARE)      30.00 SECONDS AFTER DUMP
...MULTIPLY DISPLAYED VALUES BY   .1000E-03      (LEGEND... + = .LT. .01    . = .LT. .0001    0 = .LT. .000001)
 M N=  1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16  17  18  19  20  21  22  23  24  25  26  27  28  29  30  31

  1 0000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000
  2 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000
  3 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000
  4 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000
  5 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000
  6 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000
  7 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000
  8 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000
  9 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000
 10 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000
 11 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000
 12 0000   0   0   0   0   0   0   0   0   0   0   0 .01 .01 .01 .01 .01   0   0   0   0   0   0   0   0   0   0   0   0   00000
 13 0000   0   0   0   0   0   0   0   0   0   0 .01 1.2 1.2 1.2 1.2 1.2 .01   0   0   0   0   0   0   0   0   0   0   0   00000
 14 0000   0   0   0   0   0   0   0   0   0   0 .01 1.2 2.7 2.7 2.7 1.2 .01   0   0   0   0   0   0   0   0   0   0   0   00000
 15 0000   0   0   0   0   0   0   0   0   0   0 .01 1.2 2.7 2.7 2.7 1.2 .01   0   0   0   0   0   0   0   0   0   0   0   00000
 16 0000   0   0   0   0   0   0   0   0   0   0 .01 1.2 2.7 2.7 2.7 1.2 .01   0   0   0   0   0   0   0   0   0   0   0   00000
 17 0000   0   0   0   0   0   0   0   0   0   0 .01 1.2 1.2 1.2 1.2 1.2 .01   0   0   0   0   0   0   0   0   0   0   0   00000
 18 0000   0   0   0   0   0   0   0   0   0   0   0 .01 .01 .01 .01 .01   0   0   0   0   0   0   0   0   0   0   0   0   00000
 19 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000
 20 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000
 21 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000
 22 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000
 23 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000
 24 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000
 25 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000
 26 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000
 27 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000
 28 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000
 29 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000
 30 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000
```

EXAMPLE OUTPUT OF MODEL EXECUTION - LONG VERSION (28 of 61)

```
THICKNESS (FT) OF 90-80  .   ACCUMULATED ON BOTTOM,      30.00 SECONDS AFTER DUMP
...MULTIPLY DISPLAYED VALUES BY   .1000E-03     (LEGEND... + = .LT. .01   . = .LT. .0001   0 = .LT. .000001)
 M N=  1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16  17  18  19  20  21  22  23  24  25  26  27  28  29  30  31
  1 0000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000
  2 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000
  3 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000
  4 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000
  5 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000
  6 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000
  7 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000
  8 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000
  9 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000
 10 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000
 11 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000
 12 0000   0   0   0   0   0   0   0   0   0   0   0   + . + . +   + . +   0   0   0   0   0   0   0   0   0   0   0   0   00000
 13 0000   0   0   0   0   0   0   0   0   0   0   + .56 .55 .55 .55 .54 . +   0   0   0   0   0   0   0   0   0   0   0   00000
 14 0000   0   0   0   0   0   0   0   0   0   0 . + .55 1.2 1.2 1.2 .55 ..+   0   0   0   0   0   0   0   0   0   0   0   00000
 15 0000   0   0   0   0   0   0   0   0   0   0   + .55 1.2 1.2 1.2 .55   +   0   0   0   0   0   0   0   0   0   0   0   00000
 16 0000   0   0   0   0   0   0   0   0   0   0   + .55 1.2 1.2 1.2 .55   +   0   0   0   0   0   0   0   0   0   0   0   00000
 17 0000   0   0   0   0   0   0   0   0   0   0   + .56 .55 .55 .55 .54 . +   0   0   0   0   0   0   0   0   0   0   0   00000
 18 0000   0   0   0   0   0   0   0   0   0   0   0   +   +   +   +   +   0   0   0   0   0   0   0   0   0   0   0   0   00000
 19 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000
 20 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000
 21 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000
 22 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000
 23 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000
 24 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000
 25 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000
 26 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000
 27 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000
 28 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000
 29 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000
 30 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000
```

EXAMPLE OUTPUT OF MODEL EXECUTION - LONG VERSION (29 of 61)

```
      BEGIN LONG TERM SIMULATION OF FATE OF 80-30

NEW CLOUD CREATED, NTCLD =     1
  T(SEC)       TX         TZ          TSIDE        TOP         TTHK        TMASS       TEMAS         NEXT       LAST
   3.649      30.00      30.00        2.353       3.951       .4853E-01   .1018E-03   0.            154           1

NEW CLOUD CREATED, NTCLD =     1
  T(SEC)       TX         TZ          TSIDE        TOP         TTHK        TMASS       TEMAS         NEXT       LAST
   4.365      30.00      30.00        4.342       3.984       .1618E-01   .8211E-03   0.            205         154

NEW CLOUD CREATED, NTCLD =     1
  T(SEC)       TX         TZ          TSIDE        TOP         TTHK        TMASS       TEMAS         NEXT       LAST
   6.082      30.00      30.00        5.201       3.984       .1618E-01   .1234E-02   0.            256         205

NEW CLOUD CREATED, NTCLD =     1
  T(SEC)       TX         TZ          TSIDE        TOP         TTHK        TMASS       TEMAS         NEXT       LAST
   7.298      30.00      30.00        5.753       3.984       .1618E-01   .1577E-02   0.            307         256

NEW CLOUD CREATED, NTCLD =     1
  T(SEC)       TX         TZ          TSIDE        TOP         TTHK        TMASS       TEMAS         NEXT       LAST
   8.514      30.00      30.00        6.031       3.984       .1618E-01   .1681E-02   0.            358         307

NEW CLOUD CREATED, NTCLD =     1
  T(SEC)       TX         TZ          TSIDE        TOP         TTHK        TMASS       TEMAS         NEXT       LAST
   9.731      30.00      30.00        6.263       3.984       .1618E-01   .1657E-02   0.            409         358

NEW CLOUD CREATED, NTCLD =     1
  T(SEC)       TX         TZ          TSIDE        TOP         TTHK        TMASS       TEMAS         NEXT       LAST
   10.95      30.00      30.00        6.363       3.984       .1618E-01   .1551E-02   0.            460         409

NEW CLOUD CREATED, NTCLD =     1
  T(SEC)       TX         TZ          TSIDE        TOP         TTHK        TMASS       TEMAS         NEXT       LAST
   12.16      30.00      30.00        6.420       3.984       .1618E-01   .1434E-02   0.            511         460

NEW CLOUD CREATED, NTCLD =     1
  T(SEC)       TX         TZ          TSIDE        TOP         TTHK        TMASS       TEMAS         NEXT       LAST
   12.31      30.00      30.00        6.424       3.773       .2212       .1237E-01   0.            517         511


    SUMMARY OF 80-30      DISTRIBUTIONS AFTER      15.00 SEC.

    TOTAL SUSPENDED MATERIAL (CUFT) =      .10367E-01
    SUSPENDED MATERIAL IN LONG TERM GRID (CUFT) =      0.
    SUSPENDED MATERIAL IN SMALL CLOUDS (CUFT) =      .10367E-01
    TOTAL MATERIAL SETTLED TO BOTTOM (CUFT) =      .12123E-01

    OUTPUT SUPPRESSED IN LOCATIONS WITH NO MATERIAL PRESENT
```

EXAMPLE OUTPUT OF MODEL EXECUTION - LONG VERSION (30 of 61)

```
     SUMMARY OF 80-30      DISTRIBUTIONS AFTER      30.00 SEC.

     TOTAL SUSPENDED MATERIAL (CUFT) =     0.
     SUSPENDED MATERIAL IN LONG TERM GRID (CUFT) =     0.
     SUSPENDED MATERIAL IN SMALL CLOUDS (CUFT) =     0.
     TOTAL MATERIAL SETTLED TO BOTTOM (CUFT) =     .22493E-01

     OUTPUT SUPPRESSED IN LOCATIONS WITH NO MATERIAL PRESENT


    COMPUTATIONS FOR 80-30      TERMINATED AT      30.00  SEC. ELAPSED TIME...MATERIAL SETTLED TO BOTTOM
```

EXAMPLE OUTPUT OF MODEL EXECUTION - LONG VERSION (31 of 61)

```
BOTTOM ACCUMULATION OF 01-30      (CUFT/GRID SQUARE)      30.00 SECONDS AFTER DUMP
...MULTIPLY DISPLAYED VALUES BY   .1000E-02      (LEGEND... * = .LT. .01   . = .LT. .0001   0 = .LT. .000001)
 N M= 1  2  3  4  5  6  7  8  9  10  11  12  13  14  15  16  17  18  19  20  21  22  23  24  25  26  27  28  29  30  31
  1 00000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000
  2 0000  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  00000
  3 0000  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  00000
  4 0000  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  00000
  5 0000  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  00000
  6 0000  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  00000
  7 0000  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  00000
  8 0000  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  00000
  9 0000  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  00000
 10 0000  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  00000
 11 0000  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  00000
 12 0000  0  0  0  0  0  0  0  0  0  0  0 .01 .01 .01 .01 .01  0  0  0  0  0  0  0  0  0  0  0  0  00000
 13 0000  0  0  0  0  0  0  0  0  0  0 .01 .73 .72 .72 .72 .78 .01  0  0  0  0  0  0  0  0  0  0  0  00000
 14 0000  0  0  0  0  0  0  0  0  0  0 .01 .72 1.1 1.1 1.1 .72 .01  0  0  0  0  0  0  0  0  0  0  0  00000
 15 0000  0  0  0  0  0  0  0  0  0  0 .01 .72 1.1 1.1 1.1 .72 .01  0  0  0  0  0  0  0  0  0  0  0  00000
 16 0000  0  0  0  0  0  0  0  0  0  0 .01 .72 1.1 1.1 1.1 .72 .01  0  0  0  0  0  0  0  0  0  0  0  00000
 17 0000  0  0  0  0  0  0  0  0  0  0 .01 .78 .72 .72 .72 .78 .01  0  0  0  0  0  0  0  0  0  0  0  00000
 18 0000  0  0  0  0  0  0  0  0  0  0  0 .01 .01 .01 .01 .01  0  0  0  0  0  0  0  0  0  0  0  0  00000
 19 0000  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  00000
 20 0000  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  00000
 21 0000  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  00000
 22 0000  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  00000
 23 0000  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  00000
 24 0000  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  00000
 25 0000  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  00000
 26 0000  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  00000
 27 0000  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  00000
 28 0000  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  00000
 29 0000  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  00000
 30 0000  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  00000
```

EXAMPLE OUTPUT OF MODEL EXECUTION - LONG VERSION (32 of 61)

```
THICKNESS (FT) OF 30-30      ACCUMULATED ON BOTTOM,      33.33 SECONDS AFTER DUMP
...MULTIPLY DISPLAYED VALUES BY   .1000E-03     (LEGEND... + = .LT. .01   . = .LT. .0001   0 = .LT. .000001)
 M N=  1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16  17  18  19  20  21  22  23  24  25  26  27  28  29  30  31

   1 000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000
   2 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
   3 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
   4 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
   5 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
   6 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
   7 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
   8 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
   9 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
  10 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
  11 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
  12 0000   0   0   0   0   0   0   0   0   0   0   0 .05 .08 .08 .08 .05   0   0   0   0   0   0   0   0   0   0   0   0  00000
  13 0000   0   0   0   0   0   0   0   0   0   0 .08 3.1 3.2 3.2 3.2 3.1 .08   0   0   0   0   0   0   0   0   0   0   0  00000
  14 0000   0   0   0   0   0   0   0   0   0   0 .08 3.2 5.2 5.2 5.2 3.2 .05   0   0   0   0   0   0   0   0   0   0   0  00000
  15 0000   0   0   0   0   0   0   0   0   0   0 .08 3.2 5.2 5.2 5.2 3.2 .05   0   0   0   0   0   0   0   0   0   0   0  00000
  16 0000   0   0   0   0   0   0   0   0   0   0 .08 3.2 5.2 5.2 5.2 3.2 .08   0   0   0   0   0   0   0   0   0   0   0  00000
  17 0000   0   0   0   0   0   0   0   0   0   0 .05 3.1 3.2 3.2 3.2 3.1 .05   0   0   0   0   0   0   0   0   0   0   0  00000
  18 0000   0   0   0   0   0   0   0   0   0   0   0 .05 .08 .08 .08 .05   0   0   0   0   0   0   0   0   0   0   0   0  00000
  19 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
  20 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
  21 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
  22 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
  23 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
  24 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
  25 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
  26 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
  27 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
  28 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
  29 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
  30 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
```

EXAMPLE OUTPUT OF MODEL EXECUTION - LONG VERSION (33 of 61)

```
     BEGIN LONG TERM SIMULATION OF FATE OF  .LT. 30

 NEW CLOUD CREATED, NTCLD =     1
   T(SEC)       TX          TZ          TSIDE        TOP         TTHK        TMASS       TEMAS          NEXT        LAST
   4.863       30.00       30.00        4.842       3.993       .2433E-02   .2123E-04   0.             203           1

 NEW CLOUD CREATED, NTCLD =     1
   T(SEC)       TX          TZ          TSIDE        TOP         TTHK        TMASS       TEMAS          NEXT        LAST
   6.082       30.00       30.00        5.201       3.993       .6082E-03   .3130E-04   0.             255         235

 NEW CLOUD CREATED, NTCLD =     1
   T(SEC)       TX          TZ          TSIDE        TOP         TTHK        TMASS       TEMAS          NEXT        LAST
   7.298       30.00       30.00        5.738       3.993       .6082E-03   .4054E-04   0.             307         256

 NEW CLOUD CREATED, NTCLD =     1
   T(SEC)       TX          TZ          TSIDE        TOP         TTHK        TMASS       TEMAS          NEXT        LAST
   8.514       30.00       30.00        6.031       3.993       .6082E-03   .4730E-04   0.             359         337

 NEW CLOUD CREATED, NTCLD =     1
   T(SEC)       TX          TZ          TSIDE        TOP         TTHK        TMASS       TEMAS          NEXT        LAST
   9.731       30.00       30.00        6.255       3.993       .6082E-03   .5134E-04   0.             409         358

 NEW CLOUD CREATED, NTCLD =     1
   T(SEC)       TX          TZ          TSIDE        TOP         TTHK        TMASS       TEMAS          NEXT        LAST
   10.95       30.00       30.00        6.353       3.993       .6082E-03   .5349E-04   0.             460         433

 NEW CLOUD CREATED, NTCLD =     1
   T(SEC)       TX          TZ          TSIDE        TOP         TTHK        TMASS       TEMAS          NEXT        LAST
   12.16       30.00       30.00        6.423       3.993       .6082E-03   .5454E-04   0.             511         458

 NEW CLOUD CREATED, NTCLD =     1
   T(SEC)       TX          TZ          TSIDE        TOP         TTHK        TMASS       TEMAS          NEXT        LAST
   12.31       30.00       30.00        6.424       3.781       .2134       .1320E-01   0.             517         511


   SUMMARY OF  .LT. 30   DISTRIBUTIONS AFTER      15.00 SEC.

   TOTAL SUSPENDED MATERIAL (CUFT) =      .131117E-01
   SUSPENDED MATERIAL IN LONG TERM GRID (CUFT) =      0.
   SUSPENDED MATERIAL IN SMALL CLOUDS (CUFT) =      .131117E-01
   TOTAL MATERIAL SETTLED TO BOTTOM (CUFT) =      .301113E-03

   OUTPUT SUPPRESSED IN LOCATIONS WITH NO MATERIAL PRESENT


   SUMMARY OF  .LT. 30   DISTRIBUTIONS AFTER      30.00 SEC.

   TOTAL SUSPENDED MATERIAL (CUFT) =      .131117E-01
```

EXAMPLE OUTPUT OF MODEL EXECUTION - LONG VERSION (34 of 61)

```
SUSPENDED MATERIAL IN SMALL CLOUDS (CUFT) =     0.
TOTAL MATERIAL SETTLED TO BOTTOM (CUFT) =     .38113E-03

OUTPUT SUPPRESSED IN LOCATIONS WITH NO MATERIAL PRESENT


SUMMARY OF  .LT. 30   DISTRIBUTIONS AFTER      45.00 SEC.

TOTAL SUSPENDED MATERIAL (CUFT) =     .13117E-01
SUSPENDED MATERIAL IN LONG TERM GRID (CUFT) =     .13117E-01
SUSPENDED MATERIAL IN SMALL CLOUDS (CUFT) =     0.
TOTAL MATERIAL SETTLED TO BOTTOM (CUFT) =     .38113E-03

OUTPUT SUPPRESSED IN LOCATIONS WITH NO MATERIAL PRESENT


SUMMARY OF  .LT. 30   DISTRIBUTIONS AFTER      60.00 SEC.

TOTAL SUSPENDED MATERIAL (CUFT) =     .13117E-01
SUSPENDED MATERIAL IN LONG TERM GRID (CUFT) =     .13117E-01
SUSPENDED MATERIAL IN SMALL CLOUDS (CUFT) =     0.
TOTAL MATERIAL SETTLED TO BOTTOM (CUFT) =     .38113E-03

OUTPUT SUPPRESSED IN LOCATIONS WITH NO MATERIAL PRESENT


SUMMARY OF  .LT. 30   DISTRIBUTIONS AFTER      75.00 SEC.

TOTAL SUSPENDED MATERIAL (CUFT) =     .13117E-01
SUSPENDED MATERIAL IN LONG TERM GRID (CUFT) =     .13117E-01
SUSPENDED MATERIAL IN SMALL CLOUDS (CUFT) =     0.
TOTAL MATERIAL SETTLED TO BOTTOM (CUFT) =     .38113E-03

OUTPUT SUPPRESSED IN LOCATIONS WITH NO MATERIAL PRESENT
```

EXAMPLE OUTPUT OF MODEL EXECUTION - LONG VERSION (35 of 61)

```
SUMMARY OF  .LT. 30   DISTRIBUTIONS AFTER      90.00 SEC.

TOTAL SUSPENDED MATERIAL (CUFT) =      .13117E-01
SUSPENDED MATERIAL IN LONG TERM GRID (CUFT) =      .13117E-01
SUSPENDED MATERIAL IN SMALL CLOUDS (CUFT) =      0.
TOTAL MATERIAL SETTLED TO BOTTOM (CUFT) =      .38113E-03

OUTPUT SUPPRESSED IN LOCATIONS WITH NO MATERIAL PRESENT



SUMMARY OF  .LT. 30   DISTRIBUTIONS AFTER     105.00 SEC.

TOTAL SUSPENDED MATERIAL (CUFT) =      .13117E-01
SUSPENDED MATERIAL IN LONG TERM GRID (CUFT) =      .13117E-01
SUSPENDED MATERIAL IN SMALL CLOUDS (CUFT) =      0.
TOTAL MATERIAL SETTLED TO BOTTOM (CUFT) =      .38113E-03

OUTPUT SUPPRESSED IN LOCATIONS WITH NO MATERIAL PRESENT



SUMMARY OF  .LT. 30   DISTRIBUTIONS AFTER     120.00 SEC.

TOTAL SUSPENDED MATERIAL (CUFT) =      .13117E-01
SUSPENDED MATERIAL IN LONG TERM GRID (CUFT) =      .13117E-01
SUSPENDED MATERIAL IN SMALL CLOUDS (CUFT) =      0.
TOTAL MATERIAL SETTLED TO BOTTOM (CUFT) =      .38113E-03

OUTPUT SUPPRESSED IN LOCATIONS WITH NO MATERIAL PRESENT



SUMMARY OF  .LT. 30   DISTRIBUTIONS AFTER     135.00 SEC.

TOTAL SUSPENDED MATERIAL (CUFT) =      .13117E-01
SUSPENDED MATERIAL IN LONG TERM GRID (CUFT) =      .13117E-01
SUSPENDED MATERIAL IN SMALL CLOUDS (CUFT) =      0.
TOTAL MATERIAL SETTLED TO BOTTOM (CUFT) =      .38113E-03

OUTPUT SUPPRESSED IN LOCATIONS WITH NO MATERIAL PRESENT
```

EXAMPLE OUTPUT OF MODEL EXECUTION - LONG VERSION (36 of 61)

```
    SUMMARY OF  .LT. 30   DISTRIBUTIONS AFTER     150.00 SEC.

    TOTAL SUSPENDED MATERIAL (CUFT) =     .13117E-01
    SUSPENDED MATERIAL IN LONG TERM GRID (CUFT) =     .13117E-01
    SUSPENDED MATERIAL IN SMALL CLOUDS (CUFT) =     0.
    TOTAL MATERIAL SETTLED TO BOTTOM (CUFT) =     .38113E-03

    OUTPUT SUPPRESSED IN LOCATIONS WITH NO MATERIAL PRESENT


FALLQ=       .000500
```

EXAMPLE OUTPUT OF MODEL EXECUTION - LONG VERSION (37 of 61)

```
CONCENTRATIONS OF  .LT. 50   (VOLUME RATIO) IN THE CLOUD     150.00 SECONDS AFTER DUMP
...MULTIPLY DISPLAYED VALUES BY   .1000E-02     (LEGEND... + = .LT. .01   . = .LT. .0001   0 = .LT. .000001)
  M N= 1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16  17  18  19  20  21  22  23  24  25  26  27  28  29  30  31

  1 0000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000
  2 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
  3 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
  4 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
  5 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
  6 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
  7 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
  8 0000   0   0   0   0   0   0   0   0   0   0   .   .   .   .   .   .   .   0   0   0   0   0   0   0   0   0   0   0  00000
  9 0000   0   0   0   0   0   0   0   0   0   .   .   +   +   +   +   +   .   .   0   0   0   0   0   0   0   0   0   0  00000
 10 0000   0   0   0   0   0   0   0   0   .   +   +   +   +   +   +   +   +   +   .   0   0   0   0   0   0   0   0   0  00000
 11 0000   0   0   0   0   0   0   0   .   +   + .01 .05 .06 .06 .06 .05 .01   +   +   .   0   0   0   0   0   0   0   0  00000
 12 0000   0   0   0   0   0   0   .   .   + .01 .08 .27 .34 .36 .34 .27 .08 .01   +   .   .   0   0   0   0   0   0   0  00000
 13 0000   0   0   0   0   0   0   .   +   + .05 .27 .73 1.0 1.0 1.0 .73 .27 .05   +   +   .   0   0   0   0   0   0   0  00000
 14 0000   0   0   0   0   0   0   .   +   + .06 .34 1.3 1.3 1.3 1.3 1.3 .34 .06   +   +   .   0   0   0   0   0   0   0  00000
 15 0000   0   0   0   0   0   0   .   +   + .06 .35 1.3 1.3 1.4 1.3 1.3 .35 .06   +   +   .   0   0   0   0   0   0   0  00000
 16 0000   0   0   0   0   0   0   .   +   + .06 .34 1.3 1.3 1.3 1.3 1.3 .34 .06   +   +   .   0   0   0   0   0   0   0  00000
 17 0000   0   0   0   0   0   0   .   +   + .05 .27 .73 1.0 1.0 1.0 .73 .27 .05   +   +   .   0   0   0   0   0   0   0  00000
 18 0000   0   0   0   0   0   0   .   .   + .01 .08 .27 .34 .36 .34 .27 .08 .01   +   .   .   0   0   0   0   0   0   0  00000
 19 0000   0   0   0   0   0   0   0   .   +   + .01 .05 .06 .06 .06 .05 .01   +   +   .   0   0   0   0   0   0   0   0  00000
 20 0000   0   0   0   0   0   0   0   0   .   +   +   +   +   +   +   +   +   +   .   0   0   0   0   0   0   0   0   0  00000
 21 0000   0   0   0   0   0   0   0   0   0   .   .   +   +   +   +   +   .   .   0   0   0   0   0   0   0   0   0   0  00000
 22 0000   0   0   0   0   0   0   0   0   0   0   .   .   .   .   .   .   .   0   0   0   0   0   0   0   0   0   0   0  00000
 23 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
 24 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
 25 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
 26 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
 27 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
 28 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
 29 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
 30 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
```

EXAMPLE OUTPUT OF MODEL EXECUTION - LONG VERSION (39 of 61)

```
POSITION OF TOP OF  .LT. 30   CLOUD (FEET BELOW SURFACE)      150.00 SECONDS AFTER DUMP
...MULTIPLY DISPLAYED VALUES BY   1.000           (LEGEND... + = .LT. .01    . = .LT. .0001   0 = .LT. .000001)
N M=  1    2    3    4    5    6    7    8    9   10   11   12   13   14   15   16   17   18   19   20   21   22   23   24   25   26   27   28   29   30   31

 1 0000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000
 2 0000    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0     00000
 3 0000    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0     00000
 4 0000    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0     00000
 5 0000    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0     00000
 6 0000    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0     00000
 7 0000    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0     00000
 8 0000    0    0    0    0    0    0    0    0    0    0  3.0  3.0  3.0  3.0  3.0  3.0  3.0    0    0    0    0    0    0    0    0    0    0    0     00000
 9 0000    0    0    0    0    0    0    0    0    0  3.0  3.0  3.0  3.0  3.0  3.0  3.0  3.0  3.0    0    0    0    0    0    0    0    0    0    0     00000
10 0000    0    0    0    0    0    0    0    0  3.0  3.0  3.0  3.0  3.0  3.0  3.0  3.0  3.0  3.0  3.0    0    0    0    0    0    0    0    0    0     00000
11 0000    0    0    0    0    0    0    0  3.0  3.0  3.0  3.0  3.0  3.0  3.0  3.0  3.0  3.0  3.0  3.0  3.0    0    0    0    0    0    0    0    0     00000
12 0000    0    0    0    0    0    0  3.0  3.0  3.0  3.0  3.0  3.0  3.0  3.0  3.0  3.0  3.0  3.0  3.0  3.0  3.0    0    0    0    0    0    0    0     00000
13 0000    0    0    0    0    0    0  3.0  3.0  3.0  3.0  3.0  3.0  3.0  3.0  3.0  3.0  3.0  3.0  3.0  3.0  3.0    0    0    0    0    0    0    0     00000
14 0000    0    0    0    0    0    0  3.0  3.0  3.0  3.0  3.0  3.0  3.0  3.0  3.0  3.0  3.0  3.0  3.0  3.0  3.0    0    0    0    0    0    0    0     00000
15 0000    0    0    0    0    0    0  3.0  3.0  3.0  3.0  3.0  3.0  3.0  3.0  3.0  3.0  3.0  3.0  3.0  3.0  3.0    0    0    0    0    0    0    0     00000
16 0000    0    0    0    0    0    0  3.0  3.0  3.0  3.0  3.0  3.0  3.0  3.0  3.0  3.0  3.0  3.0  3.0  3.0  3.0    0    0    0    0    0    0    0     00000
17 0000    0    0    0    0    0    0  3.0  3.0  3.0  3.0  3.0  3.0  3.0  3.0  3.0  3.0  3.0  3.0  3.0  3.0  3.0    0    0    0    0    0    0    0     00000
18 0000    0    0    0    0    0    0  3.0  3.0  3.0  3.0  3.0  3.0  3.0  3.0  3.0  3.0  3.0  3.0  3.0  3.0  3.0    0    0    0    0    0    0    0     00000
19 0000    0    0    0    0    0    0    0  3.0  3.0  3.0  3.0  3.0  3.0  3.0  3.0  3.0  3.0  3.0  3.0  3.0    0    0    0    0    0    0    0    0     00000
20 0000    0    0    0    0    0    0    0    0  3.0  3.0  3.0  3.0  3.0  3.0  3.0  3.0  3.0  3.0  3.0    0    0    0    0    0    0    0    0    0     00000
21 0000    0    0    0    0    0    0    0    0    0  3.0  3.0  3.0  3.0  3.0  3.0  3.0  3.0  3.0    0    0    0    0    0    0    0    0    0    0     00000
22 0000    0    0    0    0    0    0    0    0    0    0  3.0  3.0  3.0  3.0  3.0  3.0  3.0    0    0    0    0    0    0    0    0    0    0    0     00000
23 0000    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0     00000
24 0000    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0     00000
25 0000    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0     00000
26 0000    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0     00000
27 0000    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0     00000
28 0000    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0     00000
29 0000    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0     00000
30 0000    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0     00000
```

EXAMPLE OUTPUT OF MODEL EXECUTION - LONG VERSION (39 of 61)

```
THICKNESS OF  .LT. 30   CLOUD (FEET)     130.00 SECONDS AFTER JUMP
...MULTIPLY DISPLAYED VALUES BY   .1000E-01     (LEGEND... + = .LT. .01   . = .LT. .0001   0 = .LT. .000001)
 N M=  1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16  17  18  19  20  21  22  23  24  25  26  27  28  29  30  31
   1 0000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000
   2 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
   3 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
   4 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
   5 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
   6 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
   7 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
   8 0000   0   0   0   0   0   0   0   0   0   0 9.1 9.1 9.1 9.1 9.1 9.1 9.1   0   0   0   0   0   0   0   0   0   0   0  00000
   9 0000   0   0   0   0   0   0   0   0   0 9.1 9.1 9.1 9.1 9.1 9.1 9.1 9.1 9.1   0   0   0   0   0   0   0   0   0   0  00000
  10 0000   0   0   0   0   0   0   0   0 9.1 9.1 9.1 9.1 9.1 9.1 9.1 9.1 9.1 9.1 9.1   0   0   0   0   0   0   0   0   0  00000
  11 0000   0   0   0   0   0   0   0 9.1 9.1 9.1 9.1 9.1 9.1 9.1 9.1 9.1 9.1 9.1 9.1 9.1   0   0   0   0   0   0   0   0  00000
  12 0000   0   0   0   0   0   0 9.1 9.1 9.1 9.1 9.1 9.1 9.1 9.1 9.1 9.1 9.1 9.1 9.1 9.1 9.1   0   0   0   0   0   0   0  00000
  13 0000   0   0   0   0   0   0 9.1 9.1 9.1 9.1 9.1 9.1 9.1 9.1 9.1 9.1 9.1 9.1 9.1 9.1 9.1   0   0   0   0   0   0   0  00000
  14 0000   0   0   0   0   0   0 9.1 9.1 9.1 9.1 9.1 9.1 9.1 9.1 9.1 9.1 9.1 9.1 9.1 9.1 9.1   0   0   0   0   0   0   0  00000
  15 0000   0   0   0   0   0   0 9.1 9.1 9.1 9.1 9.1 9.1 9.1 9.1 9.1 9.1 9.1 9.1 9.1 9.1 9.1   0   0   0   0   0   0   0  00000
  16 0000   0   0   0   0   0   0 9.1 9.1 9.1 9.1 9.1 9.1 9.1 9.1 9.1 9.1 9.1 9.1 9.1 9.1 9.1   0   0   0   0   0   0   0  00000
  17 0000   0   0   0   0   0   0 9.1 9.1 9.1 9.1 9.1 9.1 9.1 9.1 9.1 9.1 9.1 9.1 9.1 9.1 9.1   0   0   0   0   0   0   0  00000
  18 0000   0   0   0   0   0   0 9.1 9.1 9.1 9.1 9.1 9.1 9.1 9.1 9.1 9.1 9.1 9.1 9.1 9.1 9.1   0   0   0   0   0   0   0  00000
  19 0000   0   0   0   0   0   0   0 9.1 9.1 9.1 9.1 9.1 9.1 9.1 9.1 9.1 9.1 9.1 9.1 9.1   0   0   0   0   0   0   0   0  00000
  20 0000   0   0   0   0   0   0   0   0 9.1 9.1 9.1 9.1 9.1 9.1 9.1 9.1 9.1 9.1 9.1   0   0   0   0   0   0   0   0   0  00000
  21 0000   0   0   0   0   0   0   0   0   0 9.1 9.1 9.1 9.1 9.1 9.1 9.1 9.1 9.1   0   0   0   0   0   0   0   0   0   0  00000
  22 0000   0   0   0   0   0   0   0   0   0   0 9.1 9.1 9.1 9.1 9.1 9.1 9.1   0   0   0   0   0   0   0   0   0   0   0  00000
  23 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
  24 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
  25 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
  26 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
  27 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
  28 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
  29 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
  30 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
```

EXAMPLE OUTPUT OF MODEL EXECUTION - LONG VERSION (40 of 61)

```
BOTTOM ACCUMULATION OF  .LT(?)SB   (CUFT/GRID SQUARE)     190.00 SECONDS AFTER DUMP
...MULTIPLY DISPLAYED VALUES BY   .1000E-04     (LEGEND... * = .LT. .01    . = .LT. .0001    0 = .LT. .0000001)
 N M=   1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16  17  18  19  20  21  22  23  24  25  26  27  28  29  30  31

  1 0000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000
  2 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000
  3 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000
  4 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000
  5 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000
  6 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000
  7 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000
  8 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000
  9 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000
 10 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000
 11 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000
 12 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000
 13 0000   0   0   0   0   0   0   0   0   0   0   0 1.1 1.1 1.1 1.1 1.1   0   0   0   0   0   0   0   0   0   0   0   0   00000
 14 0000   0   0   0   0   0   0   0   0   0   0   0 1.1 2.1 2.1 2.1 1.1   0   0   0   0   0   0   0   0   0   0   0   0   00000
 15 0000   0   0   0   0   0   0   0   0   0   0   0 1.1 2.1 2.1 2.1 1.1   0   0   0   0   0   0   0   0   0   0   0   0   00000
 16 0000   0   0   0   0   0   0   0   0   0   0   0 1.1 2.1 2.1 2.1 1.1   0   0   0   0   0   0   0   0   0   0   0   0   00000
 17 0000   0   0   0   0   0   0   0   0   0   0   0 1.1 1.1 1.1 1.1 1.1   0   0   0   0   0   0   0   0   0   0   0   0   00000
 18 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000
 19 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000
 20 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000
 21 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000
 22 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000
 23 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000
 24 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000
 25 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000
 26 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000
 27 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000
 28 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000
 29 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000
 30 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000
```

EXAMPLE OUTPUT OF MODEL EXECUTION - LONG VERSION (41 of 61)

```
SUMMARY OF  .LT. 30   DISTRIBUTIONS AFTER     165.00 SEC.

TOTAL SUSPENDED MATERIAL (CUFT) =      .13117E-01
SUSPENDED MATERIAL IN LONG TERM GRID (CUFT) =      .13117E-01
SUSPENDED MATERIAL IN SMALL CLOUDS (CUFT) =      0.
TOTAL MATERIAL SETTLED TO BOTTOM (CUFT) =      .38113E-03

OUTPUT SUPPRESSED IN LOCATIONS WITH NO MATERIAL PRESENT



SUMMARY OF  .LT. 30   DISTRIBUTIONS AFTER     180.00 SEC.

TOTAL SUSPENDED MATERIAL (CUFT) =      .13117E-01
SUSPENDED MATERIAL IN LONG TERM GRID (CUFT) =      .13117E-01
SUSPENDED MATERIAL IN SMALL CLOUDS (CUFT) =      0.
TOTAL MATERIAL SETTLED TO BOTTOM (CUFT) =      .38113E-03

OUTPUT SUPPRESSED IN LOCATIONS WITH NO MATERIAL PRESENT



SUMMARY OF  .LT. 30   DISTRIBUTIONS AFTER     195.00 SEC.

TOTAL SUSPENDED MATERIAL (CUFT) =      .13117E-01
SUSPENDED MATERIAL IN LONG TERM GRID (CUFT) =      .13117E-01
SUSPENDED MATERIAL IN SMALL CLOUDS (CUFT) =      0.
TOTAL MATERIAL SETTLED TO BOTTOM (CUFT) =      .38113E-03

OUTPUT SUPPRESSED IN LOCATIONS WITH NO MATERIAL PRESENT



SUMMARY OF  .LT. 30   DISTRIBUTIONS AFTER     210.00 SEC.

TOTAL SUSPENDED MATERIAL (CUFT) =      .13117E-01
SUSPENDED MATERIAL IN LONG TERM GRID (CUFT) =      .13117E-01
SUSPENDED MATERIAL IN SMALL CLOUDS (CUFT) =      0.
TOTAL MATERIAL SETTLED TO BOTTOM (CUFT) =      .38113E-03

OUTPUT SUPPRESSED IN LOCATIONS WITH NO MATERIAL PRESENT
```

EXAMPLE OUTPUT OF MODEL EXECUTION - LONG VERSION (42 of 61)

```
SUMMARY OF  .LT. 30   DISTRIBUTIONS AFTER     225.00 SEC.

 TOTAL SUSPENDED MATERIAL (CUFT) =     .13117E-01
 SUSPENDED MATERIAL IN LONG TERM GRID (CUFT) =     .13117E-01
 SUSPENDED MATERIAL IN SMALL CLOUDS (CUFT) =     0.
 TOTAL MATERIAL SETTLED TO BOTTOM (CUFT) =     .38113E-03

 OUTPUT SUPPRESSED IN LOCATIONS WITH NO MATERIAL PRESENT


  SUMMARY OF  .LT. 30   DISTRIBUTIONS AFTER     240.00 SEC.

  TOTAL SUSPENDED MATERIAL (CUFT) =     .13117E-01
  SUSPENDED MATERIAL IN LONG TERM GRID (CUFT) =     .13117E-01
  SUSPENDED MATERIAL IN SMALL CLOUDS (CUFT) =     0.
  TOTAL MATERIAL SETTLED TO BOTTOM (CUFT) =     .38113E-03

  OUTPUT SUPPRESSED IN LOCATIONS WITH NO MATERIAL PRESENT


  SUMMARY OF  .LT. 30   DISTRIBUTIONS AFTER     255.00 SEC.

  TOTAL SUSPENDED MATERIAL (CUFT) =     .13117E-01
  SUSPENDED MATERIAL IN LONG TERM GRID (CUFT) =     .13117E-01
  SUSPENDED MATERIAL IN SMALL CLOUDS (CUFT) =     0.
  TOTAL MATERIAL SETTLED TO BOTTOM (CUFT) =     .38113E-03

  OUTPUT SUPPRESSED IN LOCATIONS WITH NO MATERIAL PRESENT


  SUMMARY OF  .LT. 30   DISTRIBUTIONS AFTER     270.00 SEC.

  TOTAL SUSPENDED MATERIAL (CUFT) =     .12995E-01
  SUSPENDED MATERIAL IN LONG TERM GRID (CUFT) =     .12995E-01
  SUSPENDED MATERIAL IN SMALL CLOUDS (CUFT) =     0.
  TOTAL MATERIAL SETTLED TO BOTTOM (CUFT) =     .50275E-03

  OUTPUT SUPPRESSED IN LOCATIONS WITH NO MATERIAL PRESENT
```

EXAMPLE OUTPUT OF MODEL EXECUTION - LONG VERSION (43 of 61)

```
SUMMARY OF  .LT. 30   DISTRIBUTIONS AFTER     285.00 SEC.

TOTAL SUSPENDED MATERIAL (CUFT) =      .11919E-01
SUSPENDED MATERIAL IN LONG TERM GRID (CUFT) =      .11919E-01
SUSPENDED MATERIAL IN SMALL CLOUDS (CUFT) =      0.
TOTAL MATERIAL SETTLED TO BOTTOM (CUFT) =      .15791E-02

OUTPUT SUPPRESSED IN LOCATIONS WITH NO MATERIAL PRESENT


SUMMARY OF  .LT. 30   DISTRIBUTIONS AFTER     300.00 SEC.

TOTAL SUSPENDED MATERIAL (CUFT) =      .10842E-01
SUSPENDED MATERIAL IN LONG TERM GRID (CUFT) =      .10842E-01
SUSPENDED MATERIAL IN SMALL CLOUDS (CUFT) =      0.
TOTAL MATERIAL SETTLED TO BOTTOM (CUFT) =      .26555E-02

OUTPUT SUPPRESSED IN LOCATIONS WITH NO MATERIAL PRESENT
```

EXAMPLE OUTPUT OF MODEL EXECUTION - LONG VERSION (44 of 61)

```
FALLD=      .000500
 CONCENTRATIONS OF  .LT. 30   (VOLUME RATIO) IN THE CLOUD     300.00 SECONDS AFTER DUMP
 ...MULTIPLY DISPLAYED VALUES BY   .1000E-02     (LEGEND... + = .LT. .01   . = .LT. .0001   0 = .LT. .000001)
  M N=   1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16  17  18  19  20  21  22  23  24  25  26  27  28  29  30  31

  1 000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000

  2 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000

  3 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000

  4 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000

  5 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000

  6 0000   0   0   0   0   0   0   0   0   0   0   0   0   .   .   .   0   0   0   0   0   0   0   0   0   0   0   0   0  00000

  7 0000   0   0   0   0   0   0   0   0   0   .   .   .   .   .   .   .   .   .   0   0   0   0   0   0   0   0   0   0  00000

  8 0000   0   0   0   0   0   0   0   0   .   .   +   +   +   +   +   +   +   .   .   0   0   0   0   0   0   0   0   0  00000

  9 0000   0   0   0   0   0   0   0   .   +   +   +   +   +   +   +   +   +   +   +   .   0   0   0   0   0   0   0   0  00000

 10 0000   0   0   0   0   0   0   .   +   +   + .01 .02 .03 .04 .03 .02 .01   +   +   +   .   0   0   0   0   0   0   0  00000

 11 0000   0   0   0   0   0   .   .   +   + .01 .05 .11 .15 .16 .15 .11 .05 .01   +   +   .   .   0   0   0   0   0   0  00000

 12 0000   0   0   0   0   0   .   +   + .01 .05 .16 .32 .42 .45 .42 .32 .16 .05 .01   +   +   .   0   0   0   0   0   0  00000

 13 0000   0   0   0   0   0   .   +   + .02 .11 .32 .62 .82 .88 .82 .62 .32 .11 .02   +   +   .   0   0   0   0   0   0  00000

 14 0000   0   0   0   0   .   .   +   + .03 .15 .42 .82 1.0 1.1 1.0 .82 .42 .15 .03   +   +   .   .   0   0   0   0   0  00000

 15 0000   0   0   0   0   .   .   +   + .04 .16 .45 .88 1.1 1.2 1.1 .88 .45 .16 .04   +   +   .   .   0   0   0   0   0  00000

 16 0000   0   0   0   0   .   .   +   + .03 .15 .42 .82 1.0 1.1 1.0 .82 .42 .15 .03   +   +   .   .   0   0   0   0   0  00000

 17 0000   0   0   0   0   0   .   +   + .02 .11 .32 .62 .82 .88 .82 .62 .32 .11 .02   +   +   .   0   0   0   0   0   0  00000

 18 0000   0   0   0   0   0   .   +   + .01 .05 .16 .32 .42 .45 .42 .32 .16 .05 .01   +   +   .   0   0   0   0   0   0  00000

 19 0000   0   0   0   0   0   .   .   +   + .01 .05 .11 .15 .16 .15 .11 .05 .01   +   +   .   .   0   0   0   0   0   0  00000

 20 0000   0   0   0   0   0   0   .   +   +   + .01 .02 .03 .04 .03 .02 .01   +   +   +   .   0   0   0   0   0   0   0  00000

 21 0000   0   0   0   0   0   0   0   .   +   +   +   +   +   +   +   +   +   +   +   .   0   0   0   0   0   0   0   0  00000

 22 0000   0   0   0   0   0   0   0   0   .   .   +   +   +   +   +   +   +   .   .   0   0   0   0   0   0   0   0   0  00000

 23 0000   0   0   0   0   0   0   0   0   0   .   .   .   .   .   .   .   .   .   0   0   0   0   0   0   0   0   0   0  00000

 24 0000   0   0   0   0   0   0   0   0   0   0   0   0   .   .   .   0   0   0   0   0   0   0   0   0   0   0   0   0  00000

 25 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000

 26 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000

 27 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000

 28 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000

 29 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000

 30 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
```

EXAMPLE OUTPUT OF MODEL EXECUTION - LONG VERSION (45 of 61)

```
POSITION OF TOP OF .LT. 30  CLOUD (FEET BELOW SURFACE)      300.00 SECONDS AFTER DUMP
...MULTIPLY DISPLAYED VALUES BY   1.000          (LEGEND... + = .LT. .01   . = .LT. .0001   0 = .LT. .000001)
 M N=   1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16  17  18  19  20  21  22  23  24  25  26  27  28  29  30  31
  1 00000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000
  2 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  0000
  3 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  0000
  4 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  0000
  5 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  0000
  6 0000   0   0   0   0   0   0   0   0   0   0   0   0 3.9 3.9 3.9   0   0   0   0   0   0   0   0   0   0   0   0   0  0000
  7 0000   0   0   0   0   0   0   0   0   0 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9   0   0   0   0   0   0   0   0   0   0  0000
  8 0000   0   0   0   0   0   0   0   0 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9   0   0   0   0   0   0   0   0   0  0000
  9 0000   0   0   0   0   0   0   0 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9   0   0   0   0   0   0   0   0  0000
 10 0000   0   0   0   0   0   0 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9   0   0   0   0   0   0   0  0000
 11 0000   0   0   0   0   0 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9   0   0   0   0   0   0  0000
 12 0000   0   0   0   0   0 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9   0   0   0   0   0   0  0000
 13 0000   0   0   0   0   0 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9   0   0   0   0   0   0  0000
 14 0000   0   0   0   0 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9   0   0   0   0   0  0000
 15 0000   0   0   0   0 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9   0   0   0   0   0  0000
 16 0000   0   0   0   0 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9   0   0   0   0   0  0000
 17 0000   0   0   0   0   0 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9   0   0   0   0   0   0  0000
 18 0000   0   0   0   0   0 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9   0   0   0   0   0   0  0000
 19 0000   0   0   0   0   0 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9   0   0   0   0   0   0  0000
 20 0000   0   0   0   0   0   0 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9   0   0   0   0   0   0   0  0000
 21 0000   0   0   0   0   0   0   0 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9   0   0   0   0   0   0   0   0  0000
 22 0000   0   0   0   0   0   0   0   0 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9   0   0   0   0   0   0   0   0   0  0000
 23 0000   0   0   0   0   0   0   0   0   0 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9   0   0   0   0   0   0   0   0   0   0  0000
 24 0000   0   0   0   0   0   0   0   0   0   0   0   0 3.9 3.9 3.9   0   0   0   0   0   0   0   0   0   0   0   0   0  0000
 25 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  0000
 26 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  0000
 27 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  0000
 28 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  0000
 29 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  0000
 30 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  0000
```

EXAMPLE OUTPUT OF MODEL EXECUTION - LONG VERSION (46 of 61)

```
THICKNESS OF .LT. 80 CLOUD (FEET)      300.00 SECONDS AFTER DUMP
...MULTIPLY DISPLAYED VALUES BY   .1000E-01      (LEGEND... + = .LT. .01   . = .LT. .0001   0 = .LT. .000001)
N N=  1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16  17  18  19  20  21  22  23  24  25  26  27  28  29  30  31

 1 000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000

 2 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
 3 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
 4 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
 5 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
 6 0000   0   0   0   0   0   0   0   0   0   0   0   0 7.5 7.5 7.5   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
 7 0000   0   0   0   0   0   0   0   0   0 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5   0   0   0   0   0   0   0   0   0   0  00000
 8 0000   0   0   0   0   0   0   0   0 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5   0   0   0   0   0   0   0   0   0  00000
 9 0000   0   0   0   0   0   0   0 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5   0   0   0   0   0   0   0   0  00000
10 0000   0   0   0   0   0   0 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5   0   0   0   0   0   0   0  00000
11 0000   0   0   0   0   0 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5   0   0   0   0   0   0  00000
12 0000   0   0   0   0   0 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5   0   0   0   0   0   0  00000
13 0000   0   0   0   0   0 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5   0   0   0   0   0   0  00000
14 0000   0   0   0   0 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5   0   0   0   0   0  00000
15 0000   0   0   0   0 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5   0   0   0   0   0  00000
16 0000   0   0   0   0 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5   0   0   0   0   0  00000
17 0000   0   0   0   0   0 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5   0   0   0   0   0   0  00000
18 0000   0   0   0   0   0 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5   0   0   0   0   0   0  00000
19 0000   0   0   0   0   0 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5   0   0   0   0   0   0  00000
20 0000   0   0   0   0   0   0 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5   0   0   0   0   0   0   0  00000
21 0000   0   0   0   0   0   0   0 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5   0   0   0   0   0   0   0   0  00000
22 0000   0   0   0   0   0   0   0   0 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5   0   0   0   0   0   0   0   0   0  00000
23 0000   0   0   0   0   0   0   0   0   0 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5   0   0   0   0   0   0   0   0   0   0  00000
24 0000   0   0   0   0   0   0   0   0   0   0   0   0 7.5 7.5 7.5   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
25 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
26 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
27 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
28 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
29 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
30 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
```

EXAMPLE OUTPUT OF MODEL EXECUTION - LONG VERSION (47 of 61)

```
BOTTOM ACCUMULATION OF  .LT. 40    (CUFT/GRID SQUARE)      300.00 SECONDS AFTER DUMP
...MULTIPLY DISPLAYED VALUES BY    .1000E-03      (LEGEND... + = .LT. .01    . = .LT. .0001    0 = .LT. .000001)
M N=   1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16  17  18  19  20  21  22  23  24  25  26  27  28  29  30  31

  1 0000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000
  2 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000
  3 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000
  4 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000
  5 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000
  6 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000
  7 0000   0   0   0   0   0   0   0   0   0   0   .   .   .   .   .   .   .   0   0   0   0   0   0   0   0   0   0   0   00000
  8 0000   0   0   0   0   0   0   0   0   .   .   +   +   +   +   +   +   +   .   .   0   0   0   0   0   0   0   0   0   00000
  9 0000   0   0   0   0   0   0   0   .   .   +   +   +   +   +   +   +   +   +   .   .   0   0   0   0   0   0   0   0   00000
 10 0000   0   0   0   0   0   0   .   .   +   +   + .01 .02 .02 .02 .01   +   +   +   .   .   0   0   0   0   0   0   0   00000
 11 0000   0   0   0   0   0   0   .   +   + .01 .03 .07 .09 .09 .09 .07 .03 .01   +   +   .   0   0   0   0   0   0   0   00000
 12 0000   0   0   0   0   0   .   +   +   + .03 .10 .23 .26 .28 .26 .20 .10 .03   +   +   +   .   0   0   0   0   0   0   00000
 13 0000   0   0   0   0   0   .   +   + .01 .07 .28 .51 .64 .68 .64 .51 .28 .07 .01   +   +   .   0   0   0   0   0   0   00000
 14 0000   0   0   0   0   0   .   +   + .02 .09 .26 .64 .92 .97 .92 .64 .25 .03 .02   +   +   .   0   0   0   0   0   0   00000
 15 0000   0   0   0   0   0   .   +   + .02 .09 .25 .68 .97 1.0 .97 .65 .28 .03 .02   +   +   .   0   0   0   0   0   0   00000
 16 0000   0   0   0   0   0   .   +   + .02 .09 .26 .64 .92 .97 .92 .64 .25 .09 .02   +   +   .   0   0   0   0   0   0   00000
 17 0000   0   0   0   0   0   .   +   + .01 .07 .28 .51 .64 .68 .54 .51 .28 .07 .01   +   +   .   0   0   0   0   0   0   00000
 18 0000   0   0   0   0   0   .   +   +   + .03 .10 .23 .26 .28 .26 .20 .10 .03   +   +   +   .   0   0   0   0   0   0   00000
 19 0000   0   0   0   0   0   0   .   +   + .01 .03 .07 .09 .09 .09 .07 .03 .01   +   +   .   0   0   0   0   0   0   0   00000
 20 0000   0   0   0   0   0   0   .   .   +   +   + .01 .02 .02 .02 .01   +   +   +   .   .   0   0   0   0   0   0   0   00000
 21 0000   0   0   0   0   0   0   0   .   .   +   +   +   +   +   +   +   +   +   .   .   0   0   0   0   0   0   0   0   00000
 22 0000   0   0   0   0   0   0   0   0   .   .   +   +   +   +   +   +   +   .   .   0   0   0   0   0   0   0   0   0   00000
 23 0000   0   0   0   0   0   0   0   0   0   0   .   .   .   .   .   .   .   0   0   0   0   0   0   0   0   0   0   0   00000
 24 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000
 25 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000
 26 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000
 27 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000
 28 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000
 29 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000
 30 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000
```

EXAMPLE OUTPUT OF MODEL EXECUTION - LONG VERSION (48 of 61)

```
SUMMARY OF  .LT. 30   DISTRIBUTIONS AFTER     390.00 SEC.

TOTAL SUSPENDED MATERIAL (CUFT) =     .43840E-02
SUSPENDED MATERIAL IN LONG TERM GRID (CUFT) =     .43840E-02
SUSPENDED MATERIAL IN SMALL CLOUDS (CUFT) =     0.
TOTAL MATERIAL SETTLED TO BOTTOM (CUFT) =     .91130E-02

OUTPUT SUPPRESSED IN LOCATIONS WITH NO MATERIAL PRESENT



SUMMARY OF  .LT. 30   DISTRIBUTIONS AFTER     405.00 SEC.

TOTAL SUSPENDED MATERIAL (CUFT) =     .33076E-02
SUSPENDED MATERIAL IN LONG TERM GRID (CUFT) =     .33076E-02
SUSPENDED MATERIAL IN SMALL CLOUDS (CUFT) =     0.
TOTAL MATERIAL SETTLED TO BOTTOM (CUFT) =     .10190E-01

OUTPUT SUPPRESSED IN LOCATIONS WITH NO MATERIAL PRESENT



SUMMARY OF  .LT. 30   DISTRIBUTIONS AFTER     420.00 SEC.

TOTAL SUSPENDED MATERIAL (CUFT) =     .22312E-02
SUSPENDED MATERIAL IN LONG TERM GRID (CUFT) =     .22312E-02
SUSPENDED MATERIAL IN SMALL CLOUDS (CUFT) =     0.
TOTAL MATERIAL SETTLED TO BOTTOM (CUFT) =     .11267E-01

OUTPUT SUPPRESSED IN LOCATIONS WITH NO MATERIAL PRESENT



SUMMARY OF  .LT. 30   DISTRIBUTIONS AFTER     435.00 SEC.

TOTAL SUSPENDED MATERIAL (CUFT) =     .11548E-02
SUSPENDED MATERIAL IN LONG TERM GRID (CUFT) =     .11548E-02
SUSPENDED MATERIAL IN SMALL CLOUDS (CUFT) =     0.
TOTAL MATERIAL SETTLED TO BOTTOM (CUFT) =     .12343E-01

OUTPUT SUPPRESSED IN LOCATIONS WITH NO MATERIAL PRESENT
```

EXAMPLE OUTPUT OF MODEL EXECUTION - LONG VERSION (49 of 61)

```
SUMMARY OF  .LT. 30   DISTRIBUTIONS AFTER     450.00 SEC.

TOTAL SUSPENDED MATERIAL (CUFT) =     .73460E-04
SUSPENDED MATERIAL IN LONG TERM GRID (CUFT) =     .73460E-04
SUSPENDED MATERIAL IN SMALL CLOUDS (CUFT) =     0.
TOTAL MATERIAL SETTLED TO BOTTOM (CUFT) =     .13410E-01

OUTPUT SUPPRESSED IN LOCATIONS WITH NO MATERIAL PRESENT


SUMMARY OF  .LT. 30   DISTRIBUTIONS AFTER     315.00 SEC.

TOTAL SUSPENDED MATERIAL (CUFT) =     .37659E-02
SUSPENDED MATERIAL IN LONG TERM GRID (CUFT) =     .37659E-02
SUSPENDED MATERIAL IN SMALL CLOUDS (CUFT) =     0.
TOTAL MATERIAL SETTLED TO BOTTOM (CUFT) =     .37310E-02

OUTPUT SUPPRESSED IN LOCATIONS WITH NO MATERIAL PRESENT


SUMMARY OF  .LT. 30   DISTRIBUTIONS AFTER     330.00 SEC.

TOTAL SUSPENDED MATERIAL (CUFT) =     .56896E-02
SUSPENDED MATERIAL IN LONG TERM GRID (CUFT) =     .56896E-02
SUSPENDED MATERIAL IN SMALL CLOUDS (CUFT) =     0.
TOTAL MATERIAL SETTLED TO BOTTOM (CUFT) =     .48083E-02

OUTPUT SUPPRESSED IN LOCATIONS WITH NO MATERIAL PRESENT


SUMMARY OF  .LT. 30   DISTRIBUTIONS AFTER     345.00 SEC.

TOTAL SUSPENDED MATERIAL (CUFT) =     .76132E-02
SUSPENDED MATERIAL IN LONG TERM GRID (CUFT) =     .76132E-02
SUSPENDED MATERIAL IN SMALL CLOUDS (CUFT) =     0.
TOTAL MATERIAL SETTLED TO BOTTOM (CUFT) =     .58847E-02

OUTPUT SUPPRESSED IN LOCATIONS WITH NO MATERIAL PRESENT
```

EXAMPLE OUTPUT OF MODEL EXECUTION - LONG VERSION (50 of 61)

```
SUMMARY OF  .LT. 30   DISTRIBUTIONS AFTER     360.00 SEC.

TOTAL SUSPENDED MATERIAL (CUFT) =      .55368E-02
SUSPENDED MATERIAL IN LONG TERM GRID (CUFT) =      .55368E-02
SUSPENDED MATERIAL IN SMALL CLOUDS (CUFT) =      0.
TOTAL MATERIAL SETTLED TO BOTTOM (CUFT) =      .69611E-02

OUTPUT SUPPRESSED IN LOCATIONS WITH NO MATERIAL PRESENT



SUMMARY OF  .LT. 30   DISTRIBUTIONS AFTER     375.00 SEC.

TOTAL SUSPENDED MATERIAL (CUFT) =      .54604E-02
SUSPENDED MATERIAL IN LONG TERM GRID (CUFT) =      .54604E-02
SUSPENDED MATERIAL IN SMALL CLOUDS (CUFT) =      0.
TOTAL MATERIAL SETTLED TO BOTTOM (CUFT) =      .80375E-02

OUTPUT SUPPRESSED IN LOCATIONS WITH NO MATERIAL PRESENT
```

EXAMPLE OUTPUT OF MODEL EXECUTION - LONG VERSION (51 of 61)

```
FALLO= ....... .000500
CONCENTRATIONS OF  .LT. 30   (VOLUME RATIO) IN THE CLOUD     450.00 SECONDS AFTER DUMP
...MULTIPLY DISPLAYED VALUES BY   .1000E-32     (LEGEND... + = .LT. .01   . = .LT. .0001   0 = .LT. .000001)
  N No 1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16  17  18  19  20  21  22  23  24  25  26  27  28  29  30  31
  1 000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000
  2 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
  3 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
  4 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
  5 0000   0   0   0   0   0   0   0   0   0   0   0   .   .   .   .   .   0   0   0   0   0   0   0   0   0   0   0   0  00000
  6 0000   0   0   0   0   0   0   0   0   0   .   .   .   .   .   .   .   .   .   0   0   0   0   0   0   0   0   0   0  00000
  7 0000   0   0   0   0   0   0   0   0   .   +   +   +   +   +   +   +   +   +   .   0   0   0   0   0   0   0   0   0  00000
  8 0000   0   0   0   0   0   0   0   .   +   +   +   +   +   +   +   +   +   +   +   .   0   0   0   0   0   0   0   0  00000
  9 0000   0   0   0   0   0   0   .   +   +   +   + .01 .02 .02 .02 .01   +   +   +   +   .   0   0   0   0   0   0   0  00000
 10 0000   0   0   0   0   0   .   +   +   + .01 .03 .05 .07 .07 .07 .05 .03 .01   +   +   +   .   0   0   0   0   0   0  00000
 11 0000   0   0   0   0   .   +   +   + .01 .04 .09 .15 .20 .21 .20 .15 .09 .04 .01   +   +   +   .   0   0   0   0   0  00000
 12 0000   0   0   0   0   .   +   +   + .03 .09 .19 .33 .43 .47 .43 .33 .19 .09 .03   +   +   +   .   0   0   0   0   0  00000
 13 0000   0   0   0   .   .   +   + .01 .05 .15 .33 .55 .72 .78 .72 .55 .33 .15 .05 .01   +   +   .   .   0   0   0   0  00000
 14 0000   0   0   0   .   .   +   + .02 .07 .20 .43 .72 .94 1.0 .94 .72 .43 .20 .07 .02   +   +   .   .   0   0   0   0  00000
 15 0000   0   0   0   .   .   +   + .02 .07 .21 .47 .78 1.0 1.1 1.0 .78 .47 .21 .07 .02   +   +   .   .   0   0   0   0  00000
 16 0000   0   0   0   .   .   +   + .02 .07 .20 .43 .72 .94 1.0 .94 .72 .43 .20 .07 .02   +   +   .   .   0   0   0   0  00000
 17 0000   0   0   0   .   .   +   + .01 .05 .15 .33 .55 .72 .78 .72 .55 .33 .15 .05 .01   +   +   .   .   0   0   0   0  00000
 18 0000   0   0   0   0   .   +   +   + .03 .09 .19 .33 .43 .47 .43 .33 .19 .09 .03   +   +   +   .   0   0   0   0   0  00000
 19 0000   0   0   0   0   .   +   +   + .01 .04 .09 .15 .20 .21 .20 .15 .09 .04 .01   +   +   +   .   0   0   0   0   0  00000
 20 0000   0   0   0   0   0   .   +   +   + .01 .03 .05 .07 .07 .07 .05 .03 .01   +   +   +   .   0   0   0   0   0   0  00000
 21 0000   0   0   0   0   0   0   .   +   +   +   + .01 .02 .02 .02 .01   +   +   +   +   .   0   0   0   0   0   0   0  00000
 22 0000   0   0   0   0   0   0   0   .   +   +   +   +   +   +   +   +   +   +   +   .   0   0   0   0   0   0   0   0  00000
 23 0000   0   0   0   0   0   0   0   0   .   +   +   +   +   +   +   +   +   +   .   0   0   0   0   0   0   0   0   0  00000
 24 0000   0   0   0   0   0   0   0   0   0   .   .   .   .   .   .   .   .   .   0   0   0   0   0   0   0   0   0   0  00000
 25 0000   0   0   0   0   0   0   0   0   0   0   0   .   .   .   .   .   0   0   0   0   0   0   0   0   0   0   0   0  00000
 26 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
 27 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
 28 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
 29 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
 30 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
```

EXAMPLE OUTPUT OF MODEL EXECUTION - LONG VERSION (52 of 61)

```
POSITION OF TOP OF .LT. 30  CLOUD (FEET BELOW SURFACE)     450.00 SECONDS AFTER DUMP
...MULTIPLY DISPLAYED VALUES BY   1.000         (LEGEND... + = .LT. .01   . = .LT. .0001   0 = .LT. .000001)
M N=   1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16  17  18  19  20  21  22  23  24  25  26  27  28  29  30  31
  1 0000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000
  2 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000
  3 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000
  4 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000
  5 0000   0   0   0   0   0   0   0   0   0   0   0 3.9 3.9 3.9 3.9 3.9   0   0   0   0   0   0   0   0   0   0   0   0   00000
  6 0000   0   0   0   0   0   0   0   0   0 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9   0   0   0   0   0   0   0   0   0   0   00000
  7 0000   0   0   0   0   0   0   0   0 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9   0   0   0   0   0   0   0   0   0   00000
  8 0000   0   0   0   0   0   0   0 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9   0   0   0   0   0   0   0   0   00000
  9 0000   0   0   0   0   0   0 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9   0   0   0   0   0   0   0   00000
 10 0000   0   0   0   0   0 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9   0   0   0   0   0   0   00000
 11 0000   0   0   0   0 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9   0   0   0   0   0   00000
 12 0000   0   0   0   0 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9   0   0   0   0   0   00000
 13 0000   0   0   0 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9   0   0   0   0   00000
 14 0000   0   0   0 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9   0   0   0   0   00000
 15 0000   0   0   0 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9   0   0   0   0   00000
 16 0000   0   0   0 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9   0   0   0   0   00000
 17 0000   0   0   0 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9   0   0   0   0   00000
 18 0000   0   0   0   0 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9   0   0   0   0   0   00000
 19 0000   0   0   0   0 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9   0   0   0   0   0   00000
 20 0000   0   0   0   0   0 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9   0   0   0   0   0   0   00000
 21 0000   0   0   0   0   0   0 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9   0   0   0   0   0   0   0   00000
 22 0000   0   0   0   0   0   0   0 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9   0   0   0   0   0   0   0   0   00000
 23 0000   0   0   0   0   0   0   0   0 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9   0   0   0   0   0   0   0   0   0   00000
 24 0000   0   0   0   0   0   0   0   0   0 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9   0   0   0   0   0   0   0   0   0   0   00000
 25 0000   0   0   0   0   0   0   0   0   0   0   0 3.9 3.9 3.9 3.9 3.9   0   0   0   0   0   0   0   0   0   0   0   0   00000
 26 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000
 27 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000
 28 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000
 29 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000
 30 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000
```

EXAMPLE OUTPUT OF MODEL EXECUTION - LONG VERSION (53 of 61)

```
THICKNESS OF .GT. 50  CLOUD (FEET)      450.00 SECONDS AFTER DUMP
...MULTIPLY DISPLAYED VALUES BY  .1000E-03     (LEGEND... * = .LT. .01   . = .LT. .0001   0 = .LT. .0000001)
M N=   1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16  17  18  19  20  21  22  23  24  25  26  27  28  29  30  31

 1 0000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000

 2 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000

 3 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000

 4 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000

 5 0000   0   0   0   0   0   0   0   0   0   0   0 5.4 5.4 5.4 5.4 5.4   0   0   0   0   0   0   0   0   0   0   0   0   00000

 6 0000   0   0   0   0   0   0   0   0   0 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4   0   0   0   0   0   0   0   0   0   0   00000

 7 0000   0   0   0   0   0   0   0   0 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4   0   0   0   0   0   0   0   0   0   00000

 8 0000   0   0   0   0   0   0   0 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4   0   0   0   0   0   0   0   0   00000

 9 0000   0   0   0   0   0   0 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4   0   0   0   0   0   0   0   00000

10 0000   0   0   0   0   0 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4   0   0   0   0   0   0   00000

11 0000   0   0   0   0 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4   0   0   0   0   0   00000

12 0000   0   0   0   0 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4   0   0   0   0   0   00000

13 0000   0   0   0 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4   0   0   0   0   00000

14 0000   0   0   0 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4   0   0   0   0   00000

15 0000   0   0   0 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4   0   0   0   0   00000

16 0000   0   0   0 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4   0   0   0   0   00000

17 0000   0   0   0 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4   0   0   0   0   00000

18 0000   0   0   0   0 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4   0   0   0   0   0   00000

19 0000   0   0   0   0 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4   0   0   0   0   0   00000

20 0000   0   0   0   0   0 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4   0   0   0   0   0   0   00000

21 0000   0   0   0   0   0   0 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4   0   0   0   0   0   0   0   00000

22 0000   0   0   0   0   0   0   0 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4   0   0   0   0   0   0   0   0   00000

23 0000   0   0   0   0   0   0   0   0 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4   0   0   0   0   0   0   0   0   0   00000

24 0000   0   0   0   0   0   0   0   0   0 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4 5.4   0   0   0   0   0   0   0   0   0   0   00000

25 0000   0   0   0   0   0   0   0   0   0   0   0 5.4 5.4 5.4 5.4 5.4   0   0   0   0   0   0   0   0   0   0   0   0   00000

26 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000

27 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000

28 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000

29 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000

30 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   00000
```

EXAMPLE OUTPUT OF MODEL EXECUTION - LONG VERSION (54 of 61)

```
BOTTOM ACCUMULATION OF .LT. 30   (CUFT/GRID SQUARE)     448.00 SECONDS AFTER DUMP
***MULTIPLY DISPLAYED VALUES BY   .1000E-03     (LEGEND... + = .LT. .01   . = .LT. .0001   0 = .LT. .0000011)
 N N=   1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16  17  18  19  20  21  22  23  24  25  26  27  28  29  30  31
  1 0000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000
  2 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
  3 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
  4 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
  5 0000   0   0   0   0   0   0   0   0   0   0   0   0   .   .   .   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
  6 0000   0   0   0   0   0   0   0   0   0   .   .   .   .   .   .   .   .   .   0   0   0   0   0   0   0   0   0   0  00000
  7 0000   0   0   0   0   0   0   0   0   .   +   +   +   +   +   +   +   +   +   .   0   0   0   0   0   0   0   0   0  00000
  8 0000   0   0   0   0   0   0   0   .   +   +   +   +   +   +   +   +   +   +   +   .   0   0   0   0   0   0   0   0  00000
  9 0000   0   0   0   0   0   0   .   +   +   + .01 .03 .04 .09 .04 .03 .01   +   +   +   .   0   0   0   0   0   0   0  00000
 10 0000   0   0   0   0   0   .   +   +   + .03 .08 .14 .13 .21 .19 .14 .08 .03   +   +   +   .   0   0   0   0   0   0  00000
 11 0000   0   0   0   0   .   +   +   + .03 .10 .26 .43 .63 .68 .53 .48 .26 .10 .03   +   +   +   .   0   0   0   0   0  00000
 12 0000   0   0   0   0   .   +   + .01 .05 .26 .66 1.1 1.5 1.6 1.5 1.1 .66 .25 .08 .01   +   +   .   0   0   0   0   0  00000
 13 0000   0   0   0   0   .   +   + .03 .14 .48 1.1 2.2 2.9 3.1 2.9 2.2 1.1 .43 .14 .03   +   +   .   0   0   0   0   0  00000
 14 0000   0   0   0   .   .   +   + .04 .13 .63 1.5 2.9 3.9 4.2 3.9 2.9 1.5 .63 .13 .04   +   +   .   .   0   0   0   0  00000
 15 0000   0   0   0   .   .   +   + .05 .21 .68 1.6 3.1 4.2 4.5 4.2 3.1 1.6 .65 .21 .05   +   +   .   .   0   0   0   0  00000
 16 0000   0   0   0   .   .   +   + .04 .13 .63 1.5 2.9 3.9 4.2 3.9 2.9 1.5 .53 .13 .04   +   +   .   .   0   0   0   0  00000
 17 0000   0   0   0   0   .   +   + .03 .14 .48 1.1 2.2 2.9 3.1 2.9 2.2 1.1 .45 .14 .03   +   +   .   0   0   0   0   0  00000
 18 0000   0   0   0   0   .   +   + .01 .05 .26 .66 1.1 1.5 1.6 1.5 1.1 .66 .25 .08 .01   +   +   .   0   0   0   0   0  00000
 19 0000   0   0   0   0   .   +   +   + .03 .10 .26 .43 .63 .68 .53 .48 .25 .10 .03   +   +   +   .   0   0   0   0   0  00000
 20 0000   0   0   0   0   0   .   +   +   + .03 .08 .14 .13 .21 .19 .14 .08 .03   +   +   +   .   0   0   0   0   0   0  00000
 21 0000   0   0   0   0   0   0   .   +   +   + .01 .03 .04 .05 .04 .03 .01   +   +   +   .   0   0   0   0   0   0   0  00000
 22 0000   0   0   0   0   0   0   0   .   +   +   +   +   +   +   +   +   +   +   +   .   0   0   0   0   0   0   0   0  00000
 23 0000   0   0   0   0   0   0   0   0   .   +   +   +   +   +   +   +   +   +   .   0   0   0   0   0   0   0   0   0  00000
 24 0000   0   0   0   0   0   0   0   0   0   .   .   .   .   .   .   .   .   .   0   0   0   0   0   0   0   0   0   0  00000
 25 0000   0   0   0   0   0   0   0   0   0   0   0   0   .   .   .   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
 26 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
 27 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
 28 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
 29 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
 30 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
```

EXAMPLE OUTPUT OF MODEL EXECUTION - LONG VERSION (55 of 61)

```
THICKNESS (FT) OF  .LT. 30   ACCUMULATED ON BOTTOM,      465.00 SECONDS AFTER DUMP
...MULTIPLY DISPLAYED VALUES BY   .1000E-03      (LEGEND... + = .LT. .01    . = .LT. .0001    0 = .LT. .000001)
  M N=  1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16  17  18  19  20  21  22  23  24  25  26  27  28  29  30  31

  1 000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000

  2 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000

  3 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000

  4 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000

  5 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000

  6 0000   0   0   0   0   0   0   0   0   0   .   .   .   .   .   .   .   .   .   0   0   0   0   0   0   0   0   0   0  00000

  7 0000   0   0   0   0   0   0   0   0   .   .   +   +   +   +   +   +   +   .   .   0   0   0   0   0   0   0   0   0  00000

  8 0000   0   0   0   0   0   0   0   .   +   +   +   +   +   +   +   +   +   +   +   .   0   0   0   0   0   0   0   0  00000

  9 0000   0   0   0   0   0   0   .   +   +   +   + .01 .02 .02 .02 .01   +   +   +   +   .   0   0   0   0   0   0   0  00000

 10 0000   0   0   0   0   0   .   +   +   + .01 .03 .05 .08 .09 .08 .05 .03 .01   +   +   +   .   0   0   0   0   0   0  00000

 11 0000   0   0   0   0   .   .   +   + .01 .04 .11 .21 .28 .30 .28 .21 .11 .04 .01   +   +   .   .   0   0   0   0   0  00000

 12 0000   0   0   0   0   .   +   +   + .03 .11 .29 .53 .70 .75 .70 .53 .29 .11 .03   +   +   +   .   0   0   0   0   0  00000

 13 0000   0   0   0   0   .   +   + .01 .05 .21 .53 1.0 1.3 1.4 1.3 1.0 .53 .21 .06 .01   +   +   .   0   0   0   0   0  00000

 14 0000   0   0   0   0   .   +   + .02 .08 .28 .70 1.3 1.7 1.8 1.7 1.3 .70 .29 .08 .02   +   +   .   0   0   0   0   0  00000

 15 0000   0   0   0   0   .   +   + .02 .09 .30 .75 1.4 1.8 2.0 1.8 1.4 .75 .30 .09 .02   +   +   .   0   0   0   0   0  00000

 16 0000   0   0   0   0   .   +   + .02 .08 .28 .70 1.3 1.7 1.8 1.7 1.3 .70 .29 .09 .02   +   +   .   0   0   0   0   0  00000

 17 0000   0   0   0   0   .   +   + .01 .06 .21 .53 1.0 1.3 1.4 1.3 1.0 .53 .21 .06 .01   +   +   .   0   0   0   0   0  00000

 18 0000   0   0   0   0   .   +   +   + .03 .11 .29 .53 .70 .75 .70 .53 .29 .11 .03   +   +   +   .   0   0   0   0   0  00000

 19 0000   0   0   0   0   .   .   +   + .01 .04 .11 .21 .28 .30 .28 .21 .11 .04 .01   +   +   .   .   0   0   0   0   0  00000

 20 0000   0   0   0   0   0   .   +   +   + .01 .03 .05 .08 .09 .08 .05 .03 .01   +   +   +   .   0   0   0   0   0   0  00000

 21 0000   0   0   0   0   0   0   .   +   +   +   + .01 .02 .02 .02 .01   +   +   +   +   .   0   0   0   0   0   0   0  00000

 22 0000   0   0   0   0   0   0   0   .   +   +   +   +   +   +   +   +   +   +   +   .   0   0   0   0   0   0   0   0  00000

 23 0000   0   0   0   0   0   0   0   0   .   .   +   +   +   +   +   +   +   .   .   0   0   0   0   0   0   0   0   0  00000

 24 0000   0   0   0   0   0   0   0   0   0   .   .   .   .   .   .   .   .   .   0   0   0   0   0   0   0   0   0   0  00000

 25 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000

 26 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000

 27 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000

 28 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000

 29 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000

 30 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
```

EXAMPLE OUTPUT OF MODEL EXECUTION - LONG VERSION (56 of 61)

```
SUMMARY OF  .LT. 30   DISTRIBUTIONS AFTER     455.00 SEC.

TOTAL SUSPENDED MATERIAL (CUFT) =     0.
SUSPENDED MATERIAL IN LONG TERM GRID (CUFT) =     0.
SUSPENDED MATERIAL IN SMALL CLOUDS (CUFT) =     0.
TOTAL MATERIAL SETTLED TO BOTTOM (CUFT) =     .13493E-01

OUTPUT SUPPRESSED IN LOCATIONS WITH NO MATERIAL PRESENT


COMPUTATIONS FOR  .LT. 30   TERMINATED AT     465.00  SEC. ELAPSED TIME...MATERIAL SETTLED TO BOTTOM
```

EXAMPLE OUTPUT OF MODEL EXECUTION - LONG VERSION (57 of 61)

```
BOTTOM ACCUMULATION OF  .LT. 30   (CUFT/GRID SQUARE)     465.00 SECONDS AFTER JUMP
...MULTIPLY DISPLAYED VALUES BY   .1000E-03     (LEGEND... + = .LT. .01    . = .LT. .0001    0 = .LT. .000001)
N V=   1    2    3    4    5    6    7    8    9   10   11   12   13   14   15   16   17   18   19   20   21   22   23   24   25   26   27   28   29   30   31
  1 00000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000
  2 0000    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0 00000
  3 0000    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0 00000
  4 0000    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0 00000
  5 0000    0    0    0    0    0    0    0    0    0    0    0    0    .    .    .    0    0    0    0    0    0    0    0    0    0    0    0    0 00000
  6 0000    0    0    0    0    0    0    0    0    0    .    .    .    .    .    .    .    .    .    0    0    0    0    0    0    0    0    0    0 00000
  7 0000    0    0    0    0    0    0    0    0    .    +    +    +    +    +    +    +    +    +    .    0    0    0    0    0    0    0    0    0 00000
  8 0000    0    0    0    0    0    0    0    .    +    +    +    +    +  .01    +    +    +    +    +    .    0    0    0    0    0    0    0    0 00000
  9 0000    0    0    0    0    0    0    .    +    +    +  .01  .03  .04  .05  .04  .03  .01    +    +    +    .    0    0    0    0    0    0    0 00000
 10 0000    0    0    0    0    0    .    +    +    +  .03  .08  .14  .19  .21  .19  .14  .08  .03    +    +    +    .    0    0    0    0    0    0 00000
 11 0000    0    0    0    0    .    +    +    +  .03  .10  .26  .43  .64  .69  .64  .43  .26  .10  .03    +    +    +    .    0    0    0    0    0 00000
 12 0000    0    0    0    0    .    +    +  .01  .08  .26  .66  1.1  1.5  1.7  1.5  1.1  .66  .25  .08  .01    +    +    .    0    0    0    0    0 00000
 13 0000    0    0    0    0    .    +    +  .03  .14  .48  1.1  2.2  2.9  3.1  2.9  2.2  1.1  .48  .14  .03    +    +    .    0    0    0    0    0 00000
 14 0000    0    0    0    .    .    +    +  .04  .13  .64  1.5  2.3  3.9  4.2  3.9  2.3  1.5  .64  .13  .04    +    +    .    .    0    0    0    0 00000
 15 0000    0    0    0    .    .    +  .01  .05  .21  .69  1.7  3.1  4.2  4.5  4.2  3.1  1.7  .69  .21  .05  .01    +    .    .    0    0    0    0 00000
 16 0000    0    0    0    .    .    +    +  .04  .13  .64  1.5  2.3  3.9  4.2  3.9  2.3  1.5  .64  .13  .04    +    +    .    .    0    0    0    0 00000
 17 0000    0    0    0    0    .    +    +  .03  .14  .48  1.1  2.2  2.9  3.1  2.9  2.2  1.1  .48  .14  .03    +    +    .    0    0    0    0    0 00000
 18 0000    0    0    0    0    .    +    +  .01  .08  .26  .66  1.1  1.5  1.7  1.5  1.1  .66  .25  .08  .01    +    +    .    0    0    0    0    0 00000
 19 0000    0    0    0    0    .    +    +    +  .03  .10  .26  .43  .64  .69  .64  .45  .25  .10  .03    +    +    +    .    0    0    0    0    0 00000
 20 0000    0    0    0    0    0    .    +    +    +  .03  .08  .14  .19  .21  .19  .14  .08  .03    +    +    +    .    0    0    0    0    0    0 00000
 21 0000    0    0    0    0    0    0    .    +    +    +  .01  .03  .04  .05  .04  .03  .01    +    +    +    .    0    0    0    0    0    0    0 00000
 22 0000    0    0    0    0    0    0    0    .    +    +    +    +    +  .01    +    +    +    +    +    .    0    0    0    0    0    0    0    0 00000
 23 0000    0    0    0    0    0    0    0    0    .    +    +    +    +    +    +    +    +    +    .    0    0    0    0    0    0    0    0    0 00000
 24 0000    0    0    0    0    0    0    0    0    0    .    .    .    .    .    .    .    .    .    0    0    0    0    0    0    0    0    0    0 00000
 25 0000    0    0    0    0    0    0    0    0    0    0    0    0    .    .    .    0    0    0    0    0    0    0    0    0    0    0    0    0 00000
 26 0000    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0 00000
 27 0000    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0 00000
 28 0000    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0 00000
 29 0000    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0 00000
 30 0000    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0 00000
```

EXAMPLE OUTPUT OF MODEL EXECUTION - LONG VERSION (58 of 61)

```
FINAL DISTRIBUTIONS OF TOTAL SETTLED MATERIAL FOLLOW.....
```

EXAMPLE OUTPUT OF MODEL EXECUTION - LONG VERSION (59 of 61)

```
TOTAL ACCUMULATED SOLID VOLUME ON BOTTOM (CUFT/GRID SQR),      600.00 SECONDS AFTER DUMP
...MULTIPLY DISPLAYED VALUES BY   .1000E-02     (LEGEND... + = .LT. .01    . = .LT. .0001    0 = .LT. .000001)
 M N=   1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16  17  18  19  20  21  22  23  24  25  26  27  28  29  30  31
 1 0000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000
 2 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
 3 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
 4 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
 5 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
 6 0000   0   0   0   0   0   0   0   0   0   0   .   .   .   .   .   .   .   0   0   0   0   0   0   0   0   0   0   0  00000
 7 0000   0   0   0   0   0   0   0   0   .   .   .   .   +   +   +   .   .   .   .   0   0   0   0   0   0   0   0   0  00000
 8 0000   0   0   0   0   0   0   0   .   .   +   +   +   +   +   +   +   +   +   .   .   0   0   0   0   0   0   0   0  00000
 9 0000   0   0   0   0   0   0   .   .   +   +   +   +   +   +   +   +   +   +   +   .   .   0   0   0   0   0   0   0  00000
10 0000   0   0   0   0   0   .   .   +   +   +   + .01 .01 .02 .01 .01   +   +   +   +   .   .   0   0   0   0   0   0  00000
11 0000   0   0   0   0   0   .   +   +   + .01 .02 .04 .06 .06 .06 .04 .02 .01   +   +   +   .   0   0   0   0   0   0  00000
12 0000   0   0   0   0   .   .   +   +   + .02 .06 .14 .18 .19 .18 .14 .05 .02   +   +   +   .   .   0   0   0   0   0  00000
13 0000   0   0   0   0   .   .   +   + .01 .04 .14 1.1 1.2 1.2 1.2 1.1 .14 .04 .01   +   +   .   .   0   0   0   0   0  00000
14 0000   0   0   0   0   .   +   +   + .01 .06 .18 1.2 2.1 2.1 2.1 1.2 .13 .05 .01   +   +   +   .   0   0   0   0   0  00000
15 0000   0   0   0   0   .   +   +   + .02 .06 .19 1.2 2.1 2.2 2.1 1.2 .13 .05 .02   +   +   +   .   0   0   0   0   0  00000
16 0000   0   0   0   0   .   +   +   + .01 .06 .18 1.2 2.1 2.1 2.1 1.2 .13 .05 .01   +   +   +   .   0   0   0   0   0  00000
17 0000   0   0   0   0   .   .   +   + .01 .04 .14 1.1 1.2 1.2 1.2 1.1 .14 .04 .01   +   +   .   .   0   0   0   0   0  00000
18 0000   0   0   0   0   .   .   +   +   + .02 .06 .14 .18 .19 .18 .14 .05 .02   +   +   +   .   .   0   0   0   0   0  00000
19 0000   0   0   0   0   0   .   +   +   + .01 .02 .04 .06 .06 .05 .04 .02 .01   +   +   +   .   0   0   0   0   0   0  00000
20 0000   0   0   0   0   0   .   .   +   +   +   + .01 .01 .02 .01 .01   +   +   +   +   .   .   0   0   0   0   0   0  00000
21 0000   0   0   0   0   0   0   .   .   +   +   +   +   +   +   +   +   +   +   +   .   .   0   0   0   0   0   0   0  00000
22 0000   0   0   0   0   0   0   0   .   .   +   +   +   +   +   +   +   +   +   .   .   0   0   0   0   0   0   0   0  00000
23 0000   0   0   0   0   0   0   0   0   .   .   .   .   +   +   +   .   .   .   .   0   0   0   0   0   0   0   0   0  00000
24 0000   0   0   0   0   0   0   0   0   0   0   .   .   .   .   .   .   .   0   0   0   0   0   0   0   0   0   0   0  00000
25 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
26 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
27 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
28 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
29 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
30 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
```

EXAMPLE OUTPUT OF MODEL EXECUTION - LONG VERSION (60 of 61)

```
TOTAL THICKNESS (FT) OF NEW MATERIAL ON BOTTOM,    600.00 SECONDS AFTER DUMP
...MULTIPLY DISPLAYED VALUES BY   .1000E-03     (LEGEND... + = .LT. .01   . = .LT. .0001   0 = .LT. .000001)
  M N= 1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16  17  18  19  20  21  22  23  24  25  26  27  28  29  30  31

  1 000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000

  2 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000

  3 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000

  4 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000

  5 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000

  6 0000   0   0   0   0   0   0   0   0   0   .   .   .   .   .   .   .   .   .   0   0   0   0   0   0   0   0   0   0  00000

  7 0000   0   0   0   0   0   0   0   0   .   .   +   +   +   +   +   +   +   .   .   0   0   0   0   0   0   0   0   0  00000

  8 0000   0   0   0   0   0   0   0   .   +   +   +   +   +   +   +   +   +   +   +   .   0   0   0   0   0   0   0   0  00000

  9 0000   0   0   0   0   0   0   .   +   +   +   + .01 .02 .02 .02 .01   +   +   +   +   .   0   0   0   0   0   0   0  00000

 10 0000   0   0   0   0   0   .   +   +   + .01 .03 .05 .08 .09 .08 .05 .03 .01   +   +   +   .   0   0   0   0   0   0  00000

 11 0000   0   0   0   0   .   .   +   + .01 .04 .11 .21 .28 .30 .28 .21 .11 .04 .01   +   +   .   .   0   0   0   0   0  00000

 12 0000   0   0   0   0   .   +   +   + .03 .11 .29 .63 .80 .85 .80 .63 .29 .11 .03   +   +   +   .   0   0   0   0   0  00000

 13 0000   0   0   0   0   .   +   + .01 .05 .21 .63 5.1 5.5 5.6 5.5 5.1 .63 .21 .06 .01   +   +   .   0   0   0   0   0  00000

 14 0000   0   0   0   0   .   +   + .02 .08 .28 .80 5.5  10  10  10 5.5 .80 .28 .08 .02   +   +   .   0   0   0   0   0  00000

 15 0000   0   0   0   0   .   +   + .02 .09 .30 .85 5.5  10  10  10 5.5 .85 .30 .09 .02   +   +   .   0   0   0   0   0  00000

 16 0000   0   0   0   0   .   +   + .02 .08 .28 .80 5.5  10  10  10 5.5 .80 .28 .08 .02   +   +   .   0   0   0   0   0  00000

 17 0000   0   0   0   0   .   +   + .01 .06 .21 .63 5.1 5.5 5.6 5.5 5.1 .63 .21 .06 .01   +   +   .   0   0   0   0   0  00000

 18 0000   0   0   0   0   .   +   +   + .03 .11 .29 .63 .80 .85 .80 .63 .29 .11 .03   +   +   +   .   0   0   0   0   0  00000

 19 0000   0   0   0   0   .   .   +   + .01 .04 .11 .21 .28 .30 .28 .21 .11 .04 .01   +   +   .   .   0   0   0   0   0  00000

 20 0000   0   0   0   0   0   .   +   +   + .01 .03 .05 .08 .09 .08 .05 .03 .01   +   +   +   .   0   0   0   0   0   0  00000

 21 0000   0   0   0   0   0   0   .   +   +   +   + .01 .02 .02 .02 .01   +   +   +   +   .   0   0   0   0   0   0   0  00000

 22 0000   0   0   0   0   0   0   0   .   +   +   +   +   +   +   +   +   +   +   +   .   0   0   0   0   0   0   0   0  00000

 23 0000   0   0   0   0   0   0   0   0   .   .   +   +   +   +   +   +   +   .   .   0   0   0   0   0   0   0   0   0  00000

 24 0000   0   0   0   0   0   0   0   0   0   .   .   .   .   .   .   .   .   .   0   0   0   0   0   0   0   0   0   0  00000

 25 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000

 26 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000

 27 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000

 28 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000

 29 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000

 30 0000   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  00000
```

EXAMPLE OUTPUT OF MODEL EXECUTION - LONG VERSION (61 of 61)

APPENDIX B

EXAMPLE OF MODEL EXECUTION - SIMPLIFIED VERSION

This appendix contains a tabulation typical of that which would be obtained from exercising the short version of the model. A limited range of the model's input/output options is available in this version, in order that the program's operation may be simplified.

Output generated for this version of the model consists of an echo of required input data, followed by graphical data representing the convective descent and collapse phases, and plots of the long-term diffusion phase. The simulation will automatically proceed through long term diffusion if this version of the model is selected.

During convective descent, a graph is presented representing cloud size, cloud depth and horizontal location of the cloud. The output of the collapse phase is similar, being composed of a graph of horizontal and vertical size of the cloud, cloud depth in the water column, and cloud concentration.

The telephone survey mentioned in Section 3B indicated that output for individual sediment components was of little use to many users. Hence, in this version of the model, only plots of total material characteristics are presented. These plots are generated for the total cloud at three time increments and detail the concentration, bottom accumulation, thickness, top surface position, and thickness of bottom accumulation for the total cloud at each grid square. Upon termination of the simulation, the total accumulation and thickness at each grid square are presented.

```
     VERIFICATION RUN -- FALL RIVER SILT -- 500 PCM

 GRID SPACING (DX) =      4.0000

                   ---AMBIENT CONDITIONS---

      DEPTH (FT)        0.          4.000
AMBIENT
DENSITY (GM/CC)       1.000       1.000


 INTERPOLATED DEPTH AT DUMP COORDINATES, H =    4.000     FT.

 -------------------------------------------------------------------------------


 TWO VELOCITY PROFILES SPECIFIED IN X AND Z DIRECTIONS FOR --QUICK LOOKS--
 DEPTH ASSUMED CONSTANT AND VELOCITIES CONSIDERED STEADY IN TIME
 VELOCITY PROFILE PARAMETERS FOLLOW...
 DU1 =    1.00     DU2 =    2.00     UU1 =     0.       UU2 =    0.
 DW1 =    1.00     DW2 =    2.00     WW1 =     0.       WW2 =    0.


 TIME PARAMETERS FOLLOW...
 TIME OF DUMP =        0.00 SECONDS AFTER START OF TIDAL CYCLE
 DURATION OF SIMULATION =     500.00 SECONDS AFTER DUMP
 LONG TERM TIME STEP (DTL) =      15.00 SECONDS


 DISCHARGE PARAMETERS...
 INITIAL RADIUS OF CLOUD, RB =    .6668000
 INITIAL DEPTH OF CLOUD CENTROID, DREL =    .2500
 INITIAL CLOUD VELOCITIES...CU(1) =    0.          CV(1) =    0.          CW(1) =    0.

 BULK PARAMETERS...
 DENSITY, ROO =    1.113000
 AGGREGATE VOIDS RATIO, BVOID =    .7800
 LIQUID LIMIT =    116.0
 AVERAGE SPECIFIC GRAVITY =    2.560

 THERE ARE  3 SOLIDS,  PARAMETERS FOLLOW.......

 DESCRIPTION  DENSITY(GM/CC)  CONCENTRATION(CUFT/CUFT)  FALL VELOCITY(FT/SEC)   VOIDS RATIO

  Q1             2.550                .2415E-01                .3250E-01        .7800
  Q2             2.550                .2415E-01                .1330E-01        .7800
  Q3             2.550                .2415E-01                .5000E-03        .7800
  FLUID          1.000                .9275                    0.
```

EXAMPLE OUTPUT OF MODEL EXECUTION - SIMPLIFIED VERSION (1 of 24)

```
          PLOT OF CLOUD PATH AND RADIUS AS SEEN FROM POINT OF RELEASE

          INDEPENDENT VARIABLE IS TIME (SEC) OVER RANGE     0.          2.3900

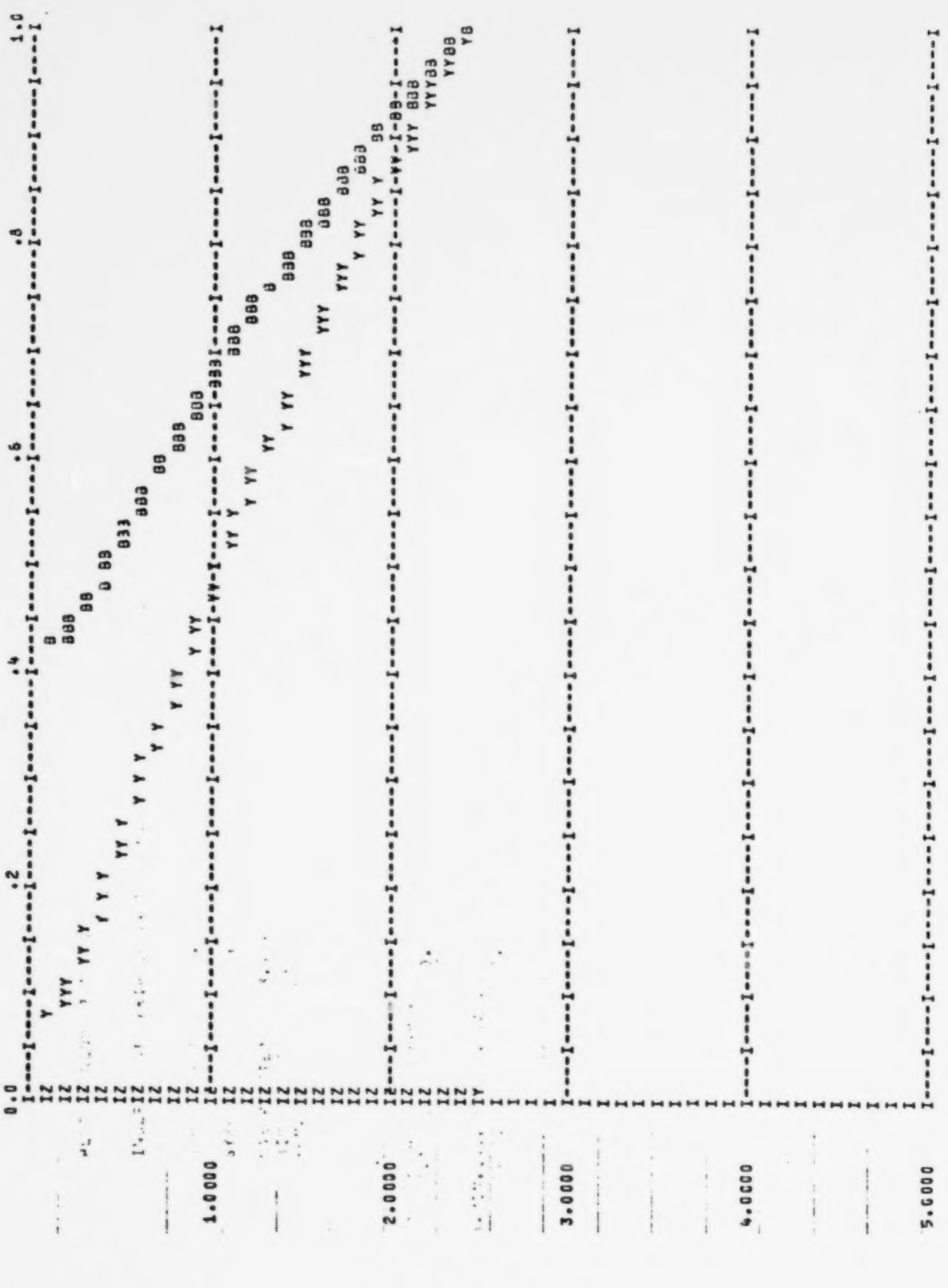
          DEPENDENT VARIABLES, ALL NORMALIZED FOR PLOTTING ON UNIT AXIS

          SYMBOL            Y                   B               X              Z

          MAX PLOTTED     3.3950             1.5850            0.             0.
          MIN PLOTTED     0.                 0.                0.             0.
          REMARKS          DEPTH              RADIUS          HOR DIST(CX)   HOR DIST(CZ)


 MAX,MIN,INC, OF IND.VAR.
        5.0000000          0.                   .10000000E+00

 MAX,MIN,INC, OF DEP. VAR.
        1.0000000          0.                   .10000000E-01
```



EXAMPLE OUTPUT OF MODEL EXECUTION - SIMPLIFIED VERSION (3 of 24)

```
PLOT OF COLLAPSING CLOUD CHARACTERISTICS

INDEPENDENT VARIABLE IS TIME OVER RANGE     0.          11.466

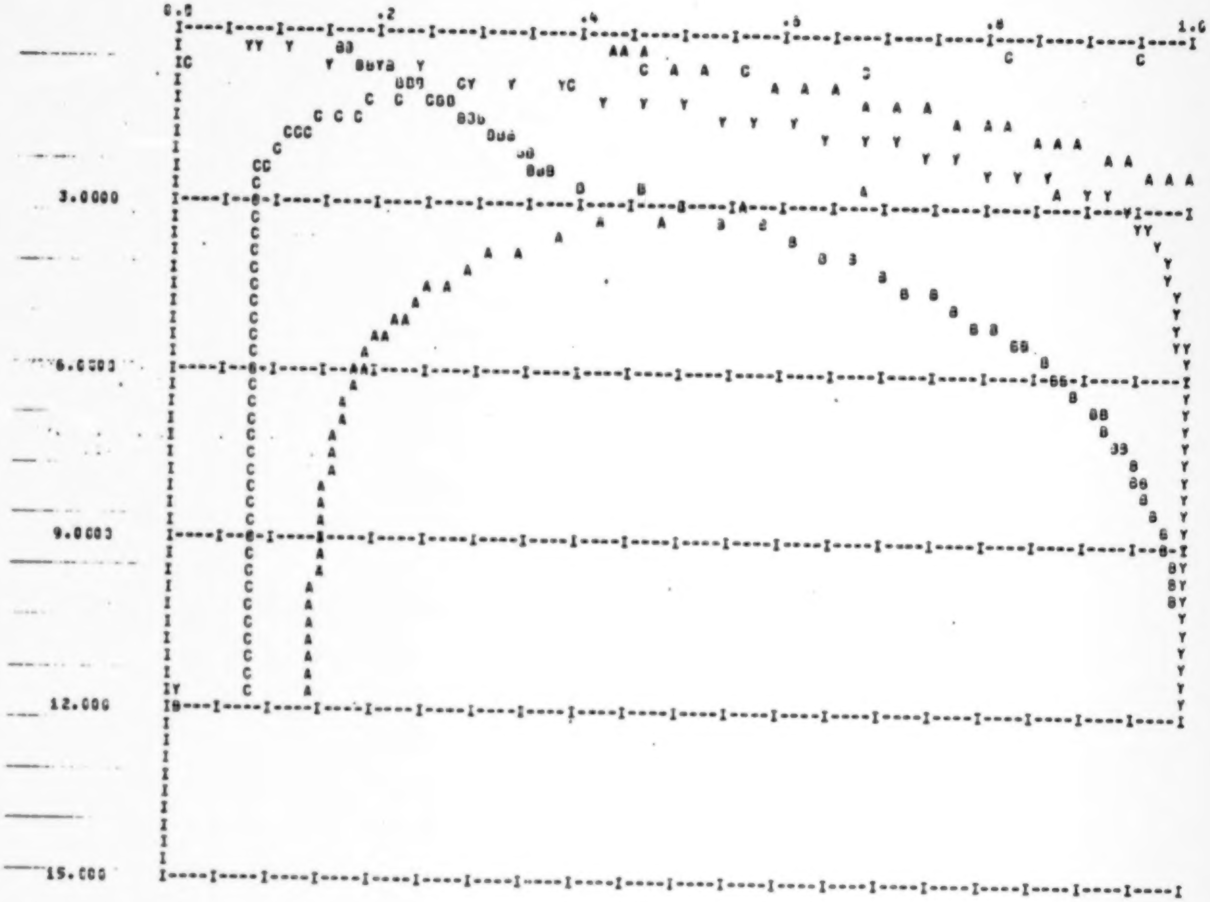
DEPENDENT VARIABLE, AL. NORMALIZED FOR PLOTTING ON UNIT AXIS

SYMBOL              A              B           C            Y
MAX PLOTTED     1.5741          8.6368      .92754       3.9193
MIN PLOTTED     0.              0.          0.           0.
REMARKS         VERT SIZE       HOR SIZE    CONCENTRATION   DEPTH


MAX,MIN,INC, OF IND.VAR.
   15.000000         0.              .30000000

MAX,MIN,INC, OF DEP. VAR.
   1.0000000         0.              .10000000E-01
```

EXAMPLE OUTPUT OF MODEL EXECUTION - SIMPLIFIED VERSION (4 of 24)



```
COMPUTATIONS FOR Q1        TERMINATED AT      90.00  SEC. ELAPSED TIME...MATERIAL SETTLED TO BOTTOM

COMPUTATIONS FOR Q2        TERMINATED AT      83.00  SEC. ELAPSED TIME...MATERIAL SETTLED TO BOTTOM
```

EXAMPLE OUTPUT OF MODEL EXECUTION - SIMPLIFIED VERSION (5 of 24)

```
 CONCENTRATIONS OF TOTAL      (VOLUME RATIO) IN THE CLOUD     150.00 SECONDS AFTER JUMP
 ...MULTIPLY DISPLAYED VALUES BY   .1000E-03     (LEGEND... + = .LT. .01   . = .LT. .0001   0 = .LT. .000001)
  M N=  1   2   3---4---5---6---7   8   9  10

   1 000000000000000000000000000000000000000

   2 0000   0   +   + .01   +   +   0   00000

   3 0000   +   + .03 .15 .03   +   +   00000

   4 0000   + .03 .31 1.2 .31 .03   +   .0000

   5 0000 .01 .15 1.2 4.2 1.2 .15 .01   +0000

   6 0000   + .03 .31 1.2 .31 .03   +   .0000

   7 0000   +   + .03 .15 .03   +   +   00000

   8 0000   0   +   + .01   +   +   0   00000

   9 0000   0   0   .   +   .   0   0   00000

  10 000000000000000000000000000000000000000
```

EXAMPLE OUTPUT OF MODEL EXECUTION - SIMPLIFIED VERSION (6 of 24)

```
BOTTOM ACCUMULATION OF TOTAL ....  (CUFT/GRID SQUARE)     150.00 SECONDS AFTER DUMP
...MULTIPLY DISPLAYED VALUES BY   .1000E-03     (LEGEND... + = .LT. .01   . = .LT. .0001   0 = .LT. .000001)
 M N=  1   2   3   4   5   6   7   8   9  10

  1 0000000000000000000000000000000000000000

  2 0000   0   .   +   +   +   .   0   00000

  3 0000   .   + .01 .07 .01   +   .   00000

  4 0000   + .01 .67 1.5 .67 .01   +   .0000

  5 0000   + .07 1.5 7.7 1.5 .07   +   +0000

  6 0000   + .01 .67 1.5 .67 .01   +   .0000

  7 0000   .   + .01 .07 .01   +   .   00000

  8 0000   0   .   +   +   +   .   0   00000

  9 0000   0   0   .   +   .   0   0   00000

 10 0000000000000000000000000000000000000000
```

EXAMPLE OUTPUT OF MODEL EXECUTION - SIMPLIFIED VERSION (7 of 24)

```
  POSITION OF TOP OF TOTAL [illegible] CLOUD (FEET BELOW SURFACE)      150.00 SECONDS AFTER JUMP
  ...MULTIPLY DISPLAYED VALUES BY   1.000          (LEGEND... + = .LT. .01    . = .LT. .0001    0 = .LT. .000001)
  M N=  1   2   3   4   5   6   7   8   9  10

    1 0000000000000000000000000000000000000000

    2 0000   0 3.2 3.2 3.2 3.2 3.2   0   00000

    3 0000 3.2 3.2 3.2 3.2 3.2 3.2 3.2   00000

    4 0000 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.20000

    5 0000 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.20000

    6 0000 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.20000

    7 0000 3.2 3.2 3.2 3.2 3.2 3.2 3.2   00000

    8 0000   0 3.2 3.2 3.2 3.2 3.2   0   00000

    9 0000   0   0 3.2 3.2 3.2   0   0   00000

   10 0000000000000000000000000000000000000000
```

EXAMPLE OUTPUT OF MODEL EXECUTION - SIMPLIFIED VERSION (8 of 24)

```
THICKNESS OF TOTAL IN CLOUD (FEET)      150.00 SECONDS AFTER DUMP
...MULTIPLY DISPLAYED VALUES BY   1.000          (LEGEND... + = .LT. .01   . = .LT. .0001   0 = .LT. .000001)
 M N=  1   2   3   4   5   6   7   8   9  10

   1 00000000000000000000000000000000000000000

   2 0000   0 .72 .72 .72 .72 .72   0   00000

   3 0000 .72 .72 .72 .72 .72 .72 .72   00000

   4 0000 .72 .72 .72 .72 .72 .72 .72 .720000

   5 0000 .72 .72 .72 .72 .72 .72 .72 .720000

   6 0000 .72 .72 .72 .72 .72 .72 .72 .720000

   7 0000 .72 .72 .72 .72 .72 .72 .72   00000

   8 0000   0 .72 .72 .72 .72 .72   0   00000

   9 0000   0   0 .72 .72 .72   0   0   00000

  10 00000000000000000000000000000000000000000
```

EXAMPLE OUTPUT OF MODEL EXECUTION - SIMPLIFIED VERSION (9 of 24)

```
 THICKNESS (FT) OF TOTAL ..   ACCUMULATED ON BOTTOM,     150.00 SECONDS AFTER DUMP
 ...MULTIPLY DISPLAYED VALUES BY   .1000E-04     (LEGEND... + = .LT. .01   . = .LT. .0001   0 = .LT. .000001)
  M N=  1    2    3    4    5    6    7    8    9  10

    1 000000000000000000000000000000000000000000

    2 0000    0 .  . ..+  ..+   .+ ...  . 0    00000

    3 0000 ..  .  +  .01  .08  .01   .+    .   00000

    4 0000 . + .01  .75  1.7  .75  .01 .  +    .0000

    5 0000 . + .08  1.7  8.5  1.7  .03 .  + .  +0000

    6 0000 . + .01  .75  1.7  .75  .01 .  +    .0000

    7 0000 .  . . +  .01  .08  .01   +  . .    00000

    8 0000    0 . . .  +    +  .  + .  .  0   00000

    9 0000    0    0 . .  . +    .    0   0    00000

   10 000000000000000000000000000000000000000000
```

EXAMPLE OUTPUT OF MODEL EXECUTION - SIMPLIFIED VERSION (10 of 24)

```
CONCENTRATIONS OF TOTAL      (VOLUME RATIO) IN THE CLOUD   . 300.00 SECONDS AFTER JUMP
...MULTIPLY DISPLAYED VALUES BY   .1000E-03     (LEGEND... + = .LT. .01   . = .LT. .0001   0 = .LT. .000001)
 M N=  1   2   3   4   5   6   7   8   9  10

   1 0000000000000000000000000000000000000000

   2 0000   +   + .02 .05 .02   +   +   .0000

   3 0000   + .03 .14 .29 .14 .03   +   +0000

   4 0000 .02 .14 .53 1.0 .53 .14 .02   +0000

   5 0000 .05 .29 1.0 2.0 1.1 .29 .05   +0000

   6 0000 .02 .14 .53 1.0 .53 .14 .02   +0000

   7 0000   + .03 .14 .29 .14 .03   +   +0000

   8 0000   +   + .02 .05 .02   +   +   .0000

   9 0000   .   +   +   +   +   +   .   00000

  10 0000000000000000000000000000000000000000
```

EXAMPLE OUTPUT OF MODEL EXECUTION - SIMPLIFIED VERSION (11 of 24)

```
 BOTTOM ACCUMULATION OF TOTAL      (CUFT/GRID SQUARE)     300.00 SECONDS AFTER DUMP
 ...MULTIPLY DISPLAYED VALUES BY   .1000E-02      (LEGEND... + = .LT. .01   . = .LT. .0001   0 = .LT. .000001)
  M N=  1    2    3    4    5    6    7    8   9  10

    1 00000000000000000000000000000000000000000

    2 0000   .    +    +    +    +    +    .   00000

    3 0000   +    +  .01  .03  .01    +    +   .0000

    4 0000   +  .01  .12  .29  .12  .01    +   +0000

    5 0000   +  .03  .29  1.1  .29  .03    +   +0000

    6 0000   +  .01  .12  .29  .12  .01    +   +0000

    7 0000   +    +  .01  .03  .01    +    +   .0000

    8 0000   .    +    +    +    +    +    .   00000

    9 0000   0    .    +    +    +    .    0   00000

   10 00000000000000000000000000000000000000000
```

EXAMPLE OUTPUT OF MODEL EXECUTION - SIMPLIFIED VERSION (12 of 24)

```
POSITION OF TOP OF TOTAL      CLOUD (FEET BELOW SURFACE)      300.00 SECONDS AFTER JUMP
...MULTIPLY DISPLAYED VALUES BY   1.000          (LEGEND... + = .LT. .01   . = .LT. .0001   0 = .LT. .000001)
 M N=  1   2   3   4   5   6   7   8   9  10

   1 0000000000000000000000000000000000000000

   2 0000 3.3 3.3 3.3 3.3 3.3 3.3 3.3 3.30000

   3 0000 3.3 3.3 3.3 3.3 3.3 3.3 3.3 3.30000

   4 0000 3.3 3.3 3.3 3.3 3.3 3.3 3.3 3.30000

   5 0000 3.3 3.3 3.3 3.3 3.3 3.3 3.3 3.30000

   6 0000 3.3 3.3 3.3 3.3 3.3 3.3 3.3 3.30000

   7 0000 3.3 3.3 3.3 3.3 3.3 3.3 3.3 3.30000

   8 0000 3.3 3.3 3.3 3.3 3.3 3.3 3.3 3.30000

   9 0000 3.3 3.3 3.3 3.3 3.3 3.3 3.3    00000

  10 0000000000000000000000000000000000000000
```

EXAMPLE OUTPUT OF MODEL EXECUTION - SIMPLIFIED VERSION (13 of 24)

```
THICKNESS OF TOTAL FUEL CLOUD (FEET) AT  300.00 SECONDS AFTER DUMP
...MULTIPLY DISPLAYED VALUES BY   1.000          (LEGEND... + = .LT. .01   . = .LT. .0001   0 = .LT. .000001)
 M N=  1   2   3   4   5   6   7   8   9  10

  1 0000000000000000000000000000000000000000

  2 0000 .65 .65 .65 .65 .65 .65 .65 .650000

  3 0000 .65 .65 .65 .65 .65 .65 .65 .650000

  4 0000 .65 .65 .65 .65 .65 .65 .65 .650000

  5 0000 .65 .65 .65 .65 .65 .65 .65 .650000

  6 0000 .65 .65 .65 .65 .65 .65 .65 .650000

  7 0000 .65 .65 .65 .65 .65 .65 .65 .650000

  8 0000 .65 .65 .65 .65 .65 .65 .65 .650000

  9 0000 .65 .65 .65 .65 .65 .65 .65   00000

 10 0000000000000000000000000000000000000000
```

EXAMPLE OUTPUT OF MODEL EXECUTION - SIMPLIFIED VERSION (14 of 24)

```
THICKNESS (FT) OF TOTAL       ACCUMULATED ON BOTTOM,     300.00 SECONDS AFTER DUMP
...MULTIPLY DISPLAYED VALUES BY   .1000E-03     (LEGEND... + = .LT. .01   . = .LT. .0001   0 = .LT. .000001)
 M N=  1   2   3   4   5   6   7   8   9  10

 1 0000000000000000000000000000000000000000

 2 0000 . . . + . + . + . + . + . .   00000

 3 0000 . + . + .01 .04 .01 . +   +   .0000

 4 0000 . + .01 .13 .32 .13 .01 . +   +0000

 5 0000 . + .04 .32 1.2 .32 .04 . +   +0000

 6 0000 . + .01 .13 .32 .13 .01 . + . +0000

 7 0000 . + . + .01 .04 .01 . +   + . .0000

 8 0000 . . . + . + . + . + . +   . . 00000

 9 0000 . 0 . . . + . + . + . . . 0   00000

10 0000000000000000000000000000000000000000
```

EXAMPLE OUTPUT OF MODEL EXECUTION - SIMPLIFIED VERSION (15 of 24)

```
 CONCENTRATIONS OF TOTAL      (VOLUME RATIO) IN THE CLOUD    450.00 SECONDS AFTER DUMP
 ...MULTIPLY DISPLAYED VALUES BY   .1000E-03     (LEGEND... + = .LT. .01    . = .LT. .0001   0 = .LT. .000001)
  M N=  1   2   3   4   5   6   7   8   9  10

    1 0000000000000000000000000000000000000000

    2 0000   + .02 .05 .08 .05 .02   +   +0000

    3 0000 .02 .08 .21 .32 .21 .08 .02   +0000

    4 0000 .05 .21 .55 .83 .55 .21 .05 .010000

    5 0000 .08 .32 .83 1.2 .83 .32 .08 .010000

    6 0000 .05 .21 .55 .83 .55 .21 .05 .010000

    7 0000 .02 .08 .21 .32 .21 .08 .02   +0000

    8 0000   + .02 .05 .08 .05 .02   +   +0000

    9 0000   +   + .01 .01 .01   +   +   +0000

   10 0000000000000000000000000000000000000000
```

EXAMPLE OUTPUT OF MODEL EXECUTION - SIMPLIFIED VERSION (16 of 24)

```
BOTTOM ACCUMULATION OF TOTAL       (CUFT/GRID SQUARE)      450.00 SECONDS AFTER DUMP
...MULTIPLY DISPLAYED VALUES BY    .1000E-02      (LEGEND... + = .LT. .01    . = .LT. .0001    0 = .LT. .000001)
 M N=  1   2   3   4   5   6   7   8   9  10

   1 0000000000000000000000000000000000000000

   2 0000    +  .  +    + .01  .  + .  +    +   .0000

   3 0000 . . + . + .03 .07 .03 .  + .  +   +0000

   4 0000 .  + .03 .18 .40 .18 .03     +   +0000

   5 0000 .01 .07 .40 1.2 .40 .07 .01     +0000

   6 0000 . . + .03 .18 .40 .18 .03  .  +  . +0000

   7 0000 .  + .  + .03 .07 .03 .  +     +   +0000

   8 0000    +  .  +  .  + .01  .  + .  +    +   .0000

   9 0000    .    + .  + .  + .  +    +    .   .0000

  10 0000000000000000000000000000000000000000
```

EXAMPLE OUTPUT OF MODEL EXECUTION - SIMPLIFIED VERSION (17 of 24)

```
POSITION OF TOP OF TOTAL    CLOUD (FEET BELOW SURFACE)     450.00 SECONDS AFTER JUMP
...MULTIPLY DISPLAYED VALUES BY   1.000         (LEGEND... + = .LT. .01   . = .LT. .0001   0 = .LT. .000001)
 M N= 1   2   3   4   5   6   7   8   9  10

   1 00000000000000000000000000000000000000000

   2 0000 3.4 3.4 3.4 3.4 3.4 3.4 3.4 3.40000

   3 0000 3.4 3.4 3.4 3.4 3.4 3.4 3.4 3.40000

   4 0000 3.4 3.4 3.4 3.4 3.4 3.4 3.4 3.40000

   5 0000 3.4 3.4 3.4 3.4 3.4 3.4 3.4 3.40000

   6 0000 3.4 3.4 3.4 3.4 3.4 3.4 3.4 3.40000

   7 0000 3.4 3.4 3.4 3.4 3.4 3.4 3.4 3.40000

   8 0000 3.4 3.4 3.4 3.4 3.4 3.4 3.4 3.40000

   9 0000 3.4 3.4 3.4 3.4 3.4 3.4 3.4 3.40000

  10 00000000000000000000000000000000000000000
```

EXAMPLE OUTPUT OF MODEL EXECUTION - SIMPLIFIED VERSION (18 of 24)

```
THICKNESS OF TOTAL      CLOUD (FEET)      450.00 SECONDS AFTER DUMP
...MULTIPLY DISPLAYED VALUES BY   1.000          (LEGEND... + = .LT. .01   . = .LT. .0001   0 = .LT. .000001)
 M N=  1   2   3   4   5   6   7   8   9  10

   1 0000000000000000000000000000000000000000

   2 0000 .57 .57 .57 .57 .57 .57 .57 .570000

   3 0000 .57 .57 .57 .57 .57 .57 .57 .570000

   4 0000 .57 .57 .57 .57 .57 .57 .57 .570000

   5 0000 .57 .57 .57 .57 .57 .57 .57 .570000

   6 0000 .57 .57 .57 .57 .57 .57 .57 .570000

   7 0000 .57 .57 .57 .57 .57 .57 .57 .570000

   8 0000 .57 .57 .57 .57 .57 .57 .57 .570000

   9 0000 .57 .57 .57 .57 .57 .57 .57 .570000

  10 0000000000000000000000000000000000000000
```

EXAMPLE OUTPUT OF MODEL EXECUTION - SIMPLIFIED VERSION (19 of 24)

```
THICKNESS (FT) OF TOTAL      ACCUMULATED ON BOTTOM,     450.00 SECONDS AFTER DUMP
...MULTIPLY DISPLAYED VALUES BY   .1000E-03     (LEGEND... + = .LT. .01   . = .LT. .0001   0 = .LT. .000001)
 M N=  1   2   3   4   5   6   7   8   9  10

  1 0000000000000000000000000000000000000000

  2 0000 . + . + . + .01 . + . + . +   .0000

  3 0000 . + .01 .03 .09 .03 .01   +   +0000

  4 0000 . + .03 .21 .44 .21 .03   +   +0000

  5 0000 .01 .08 .44 1.4 .44 .03 .01   +0000

  6 0000 . + .03 .21 .44 .21 .03 . +   +0000

  7 0000 . + .01 .03 .09 .03 .01   +   +0000

  8 0000 . + . + . + .01   + . + . +   .0000

  9 0000 . + . + . + . +   + . + . .   .0000

 10 0000000000000000000000000000000000000000
```

EXAMPLE OUTPUT OF MODEL EXECUTION - SIMPLIFIED VERSION (20 of 24)

```
FINAL DISTRIBUTIONS OF TOTAL SETTLED MATERIAL FOLLOW.....
```

EXAMPLE OUTPUT OF MODEL EXECUTION - SIMPLIFIED VERSION (21 of 24)

```
TOTAL ACCUMULATED SOLID VOLUME ON BOTTOM (CUFT/GRID SQR).     600.00 SECONDS AFTER DUMP
...MULTIPLY DISPLAYED VALUES BY    .1000E-01      (LEGEND... + = .LT. .01    . = .LT. .0001    0 = .LT. .000001)
 M N=  1    2    3    4    5    6    7    8    9  10

   1 000000000000000000000000000000000000000000000

   2 0000    +    +    +    +    +    +    +   .0000

   3 0000    +    +    + .01    +    +    +   +0000

   4 0000    +    + .27  .33  .27    +    +   +0000

   5 0000    + .01 .33  1.0  .33  .01    +   +0000

   6 0000    +    + .27  .33  .27    +    +   +0000

   7 0000    +    +    + .01    +    +    +   +0000

   8 0000    +    +    +    +    +    +    +   .0000

   9 0000    .    +    +    +    +    +    .   .0000

  10 000000000000000000000000000000000000000000000
```

EXAMPLE OUTPUT OF MODEL EXECUTION - SIMPLIFIED VERSION (22 of 24)

```
TOTAL THICKNESS (FT) OF NEW MATERIAL ON BOTTOM,    660.00 SECONDS AFTER DUMP
...MULTIPLY DISPLAYED VALUES BY   .1000E-02     (LEGEND... + = .LT. .01   . = .LT. .0001   0 = .LT. .000001)
 M N=  1   2   3   4   5   6   7   8   9  10

  1 0000000000000000000000000000000000000000

  2 0000   +   +   +   +   +   +   +  .0000

  3 0000   +   +   + .01   +   +   +  +0000

  4 0000   +   + .30 .37 .30   +   +  +0000

  5 0000   + .01 .37 1.1 .37 .01   +  +0000

  6 0000   +   + .30 .37 .30   +   +  +0000

  7 0000   +   +   + .01   +   +   +  +0000

  8 0000   +   +   +   +   +   +   +  .0000

  9 0000   .   +   +   +   +   +   .  .0000

 10 0000000000000000000000000000000000000000
```

EXAMPLE OUTPUT OF MODEL EXECUTION - SIMPLIFIED VERSION (23 of 24)

```
RUN COMPLETED; CPU TIME = 14.455 SEC.
```

EXAMPLE OUTPUT OF MODEL EXECUTION - SIMPLIFIED VERSION (24 of 24)